Veterinary Medicine

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Foot and Mouth Disease in Texas

For the first time in its history a new outbreak of foot-and-mouth disease has appeared in the United States before the complete eradication of the last preceding outbreak. At least, it appears that the recent outbreak at Houston has no connection with the California enzootic, notwithstanding the Texas quarantine against importation of animals from California had been lifted only one week when the disease appeared in Texas.

Little apprehension of the spread of the Texas outbreak is felt by the officials. The disease was discovered when it existed in only three herds and the forces of the Federal Bureau of Animal Industry quickly mobilized for its suppression. The outbreak occurred in a settled portion of the country, where cattle are kept in fenced enclosures and are used to handling. The co-operation of the Texas officials with the federal forces is complete, and little difficulty in enforcing quarantine is expected.

Dr. Marion Imes, of the Bureau of Animal Industry, was placed in general charge of the state and federal eradication forces, effective October 1st. The federal force numbers 45 inspectors trained in foot-and-mouth disease control work. In addition to its co-operation of a veterinary nature, the state has detailed a detachment of its famous Texas rangers to the quarantined area. These men will see that stockmen and the public comply with quarantine regulations to the last detail.

The three infected herds, containing a total of 1,900 cattle, have all been slaughtered and buried. As a precaution, poisoned baits have been used freely for the destruction of coyotes and other roving animals. A corps of riders and guards is likewise on duty to prevent the straying or drifting of cattle in the region. As the period of incubation of foot-and-mouth disease is from two to twenty-one days, depending upon the kind of exposure, department veterinarians withhold judgment as to the proportions the outbreak may assume.

The Ellington Aviation Field, near Houston, Texas, and in the quarantined area, is bordered on two sides by infected pastures. The War Department has instructed the commanding officer to co-operate with Doctor Imes in any measure necessary to prevent the spread of the disease, even to the extent of closing the field entirely. The principal danger, department officials explain, is not so much in the movement of airplanes, as might be inferred, but in the spread of infection by visitors to the field, and employees and vehicles engaged in the movement of supplies.

The excellent co-operation in combating the outbreak is illustrated by the public-spirited attitude of the cattle owner whose herd was the first to be condemned. The herd belonged to Rev. William S. Jacobs, pastor of the First Presbyterian Church in Houston, and a breeder and fancier of Brahman cattle. These are the hump-backed cattle of India, which are raised extensively in southeast Texas. The satisfactory appraisal of such cattle offers difficulties not met with in placing values on stock of the more common breeds. Doctor Jacobs, however, expressed his desire to have the herd slaughtered promptly to prevent the possible spread of infection, remarking that the question of valuation could be settled later.

While a number of states have issued quarantine orders prohibiting the entry of certain products from Texas, such quarantine orders have not been so drastic as some of those promulgated during the California outbreak.

The Texas outbreak is the eighth appearance of foot-and-mouth disease in this country. The first was in 1870, the second in 1880, the third in 1884, the fourth in 1902, the fifth in 1908, the sixth in 1914, the seventh in February, 1924, and the present one which was discovered September 26th.

Bovine piroplasmosis, or as it is more generally termed, the yellows, is the main obstacle to cattle rearing and improvement in Algeria.

Thornton, after the examination of specimens of Ascaris lumbricoides from both pigs and chimpanzees, has reached the conclusion that the same parasite affects both animals, and also, of course, man.

FRESH AIR RECOMMENDED AS PREVENTATIVE OF BOVINE TUBERCULOSIS

At a recent meeting of the farmers and other business representatives of Illinois hospitals and prisons, some rather important information about bovine tuberculosis was brought out, and perhaps as was to be expected when laymen draw conclusions from scientific data, wrong conclusions were deduced.

Mr. McKinstry, the farm consultant, is quoted as saying that three years' work in tuberculosis eradication had convinced him of the beneficial effects of fresh air. Apparently he has never read, probably never heard of, the rather plentiful literature describing the prevalence of tuberculosis on the open ranges of Idaho and of California among cattle that are never housed during their entire lives. As proof of his discovery, Mr. McKinstry cites the following experience: "In 1921 four institutions had suitable open air sheds. In four other institutions there were no sheds, but the cows stayed in the open most of the time. In these eight institutions only 6 per cent of the cows were found tuberculous. In ten other institutions, in which the cows were splendidly housed in tight stables, 67 per cent of the closely housed cows responded to the tuberculin test."

At the same meeting, a Mr. Dunning entirely agreed with Mr. McKinstry and said that in bad weather he sacrificed milk yield for open air and safety in the matter of tuberculosis infestation, stating: "I kept the cows in the open air, even though to do so during some weather caused the milk production to drop, but the cows kept vigorous, strong and free from tuberculosis. On the other hand, cows at St. Charles were kept in a fine, close, snug, warm barn. Conditions seemed ideal. On first test 85 per cent of these cows were found tuberculous. On a second test, another 14 per cent were found to be re-actors. Of the 100 cows in this barn when the test was begun, all but one had been killed because of tuberculosis."

Dr. W. A. Evans, commenting on this in one of his health articles, says: "Old timers remember when the then superintendent of St. Charles gave a banquet to a committee of the legislature in this barn. He was quoted as boasting that he was not afraid of tuberculosis in his dairy herd nor in their milk; that he was proud of the fact that he fed it to the inmates. If 99 per cent of the cows have since died of tuberculosis, a person wonders what per cent of the then inmates of St. Charles have since died of tuberculosis in prisons and elsewhere."

The entirely feasible project of eliminating the source of the infection seems not to have occurred to any one at the conference.

TO THE MEDICAL, DENTAL, AND VETERINARY PROFESSIONS

On Defense Day the medical profession gave splendid evidence of their support of the National Defense policy.

Officers of the Medical, Dental, and Veterinary sections of the Officers' Reserve Corps, and members of the professions not so enrolled, responded to the call in a most gratifying manner, and contributed materially to the success of the Nation's test of its citizens' availability for the protection of the country in emergency.

I desire to express my sincere appreciation of the continued evidence of support which the medical, dental, and veterinary professions are giving to the War Department in the effort to develop adequate medical, dental and veterinary services for the Army.

The obligation for the organization, in peace, of the units of the Medical Department is appropriately placed upon the medical, dental, and veterinary professions of the country. Supervision of this organization as the military representative of these professions is one of the outstanding obligations of my office.

Numerically, the Medical Department sections of the Officers' Reserve Corps are inadequate for the War Department plan. Very definite progress has been made in the development of units of the Medical Department, but the organization is far from the perfect machine which the achievements of the medical, dental, and veterinary professions should warrant.

Efficient organization cannot be effected without a Medical Department Reserve of 20,000 medical, 5,000 dental, and 2,000 veterinary officers. Only fifty per cent of this enrollment has been attained.

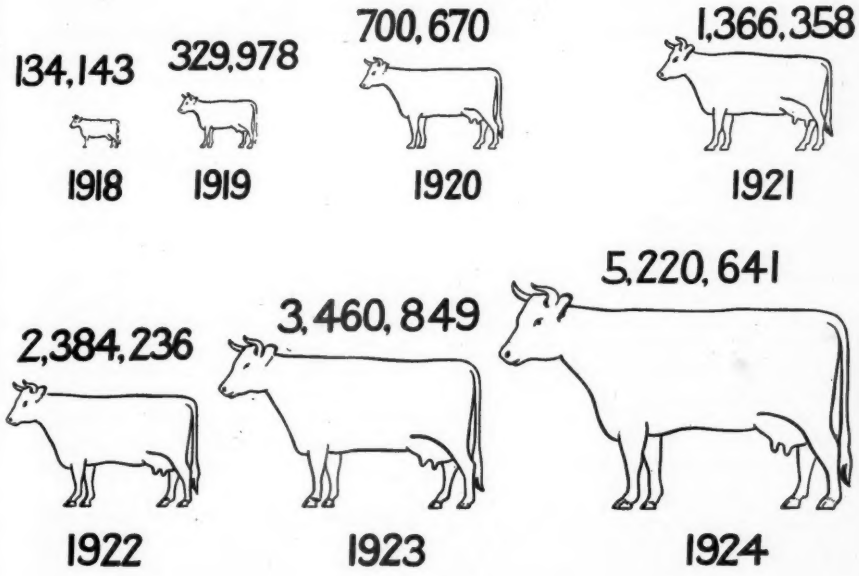
I cannot too strongly urge the necessity for completion of the Medical Program at an early date, and it is my sincere hope that the medical societies will present to their membership, and the officers of the Reserve Corps to their colleagues, the importance of enrollment in the Reserve.

Further, our organization plans are imperfect, and I desire that officers of the Reserve Corps give the War Department the advantage of constructive criticism which will aid the harmonious and efficient development of medical units which will serve the Army efficiently and to the credit of the professions.

M. W. Ireland,
The Surgeon General

CATTLE TUBERCULIN-TESTED ANNUALLY IN THE UNITED STATES UNDER THE SYSTEMATIC PLAN FOR TUBERCULOSIS ERADICATION

1918 – 1924



INCREASE IN THE SIZE OF THESE COWS FROM YEAR TO YEAR INDICATES INCREASE IN SENTIMENT FAVORING TUBERCULOSIS ERADICATION

(Chart issued by the U. S. Bureau of Animal Industry, illustrating development of co-operative tuberculosis eradication.)

VETERINARIANS NOT ACTIVE IN PUBLIC HEALTH ASSOCIATION

The American Public Health Association has just issued a complete roster of its membership. It contains the names of seventeen veterinarians, as follows: Frank G. Atwood, New Haven, Conn.; Edw. A. Cahill, Indianapolis, Ind.; D. M. Campbell, Chicago, Ill.; Thurman M. Dick, Little Rock, Ark.; Paul Fischer, Bartow, Fla.; James G. Fish, Jacksonville, Fla.; S. H. Gilliland, Marietta, Pa.; Rob't. Graham, Champaign, Ill.; Lester H. Howard, Boston, Mass.; V. A. Moore, Ithaca, N. Y.; H. B. Roshon, Reading, Pa.; Clarence E. Smith, Greenville, S. C.; D. R. Smith, Norfolk, Va.; Archibald R. Ward, Detroit, Mich.; David S. White, Columbus, Ohio; W. E. A. Wyman, St. Petersburg, Fla.; A. W. Zeibold, Miami, Fla.

Because of the large number of veterinarians engaged in municipal meat and dairy inspection and in state and county work, having a bearing on public health, it would appear that the profession should be represented by many times this number in the national association. The numerous papers presented at state and other veterinary association meetings on public health problems and the interest taken in the discussion of them by practitioners are evidence that veterinarians are widely interested in such problems and should in considerable numbers be members of the national association of those interested in public health.

NUTRITIONAL ROUP

Five years ago Haring, Beach and Jaffa, of the California agricultural experiment station, reported extensive losses of pullets in California flocks from a nutritional disease resembling roup. J. R. Beach has continued the investigation of this disease and now in station bulletin No. 378 reports that the disease has been determined to be due to vitamin A deficiency.

Cod liver oil or green food such as lawn clippings, proved preventives of the trouble. When green food is not available, the author thinks that the use of yellow corn and buttermilk in the ration will give satisfactory results as a preventive of this disease. In fact, he attributes the comparative rarity of the disease in midwestern flocks during the winter time to the liberal feeding of yellow corn. It appears that the use of yellow corn as a ration for poultry is not common in California, and on this account the flocks suffer when green food is not available.

DISINFECTION OF HOG BARNS AND HOG LOTS PRACTICABLE

"The influence of low temperatures and of disinfectants on the eggs of Ascaris lumbricoides," is the title of an article in the Journal of Agricultural Research by Eloise B. Cram of the Zoological Division of the Bureau of Animal Industry.

Previous investigation has shown that ascaris eggs will retain their viability through the winter under hog lot conditions in any part of the United States, and since as is well known, five or even ten per cent of formalin or mercuric chlorid makes a good culture medium for these eggs, and they are not destroyed even by 50 per cent alcohol or 20 per cent sulphuric acid, it has been thought that the only practical means of ridding premises of ascarid infestation was to remove all hogs from the place for a considerable period of time.

The investigations of Miss Cram, however, indicate that phenol and cresol are destructive to the ascaris eggs and a six per cent solution of liquor cresolis compositus will destroy them in about twelve hours. She suggests as a means of disinfecting sanitary pens that they be sprayed thoroughly with a six per cent cresolis solution four times on two consecutive days. She emphasizes the importance of thorough cleaning before applying the disinfectant, stating that the mechanical action of thorough scrubbing and the heat of scalding water used in the cleaning are of material assistance and that the destructive action of the chemicals alone should not be expected to replace these measures.

This may make it practical under some conditions to have pigs farrowed in barns earlier than would be advisable by the isolated single house method.

SPECIFIC THERAPY

From time immemorial the natives of Peru have used cinchona bark as a remedy for malaria. White men learned of this nearly three centuries ago, and notwithstanding all the progress that has been made in medicine in that time, we must still go to cinchona bark for a remedy for malaria.

All our modern scientific efforts have failed to produce the equal of ipecacuanha and its derivatives for amebic dysentery. This the natives of Brazil were using when white men first visited that country.

When Europeans reached the shores of North America, they found the Indians here using

chenopodium for intestinal round worms, and except for carbon tetrachlorid of recent popularity, it is still after 400 years of medical progress the premier remedy for these parasites.

In the battle with piroplasmoses, chemotherapy has achieved notable success in the production of specifics, though none of its preparations have such a wide range of usefulness as either quinin or emetin. The specific remedies of chemotherapy fall into two groups—the anilin dyes and arsenic derivatives. Of the former, trypan red, trypan blue and afridol violet, and of the arsenical preparations, neosalvarsan, Bayer 205 and Fourneau's 309, are the most noteworthy.

Silberstein computes the length of the radius of the universe as being 684,000,000,000,000,000 miles and the circumference as being 360,000,000,000 light years. A light year is 63,000 times the distance from the earth to the sun or the distance light will travel in a year at the rate of 186,000 miles a second, or six trillion miles.

The Canadian Veterinary Record has been resuscitated after a considerable period of suspended animation, and has issued one number for 1924. Beginning in January, 1925, it is the intention of those responsible for its publication to publish the Record as a monthly. It is devoted to the interests of Canadian veterinarians and it is expected to be the official organ of the veterinarians in the Dominion. Hebron H. Ross is the new editor and the publication will be issued at Toronto, Canada.

Today the veterinary profession has a very important problem to meet in helping to define and establish the proper relation between the Agricultural Extension Service, the Regulatory Veterinary Service and veterinary practice. Every institution, to exist, must serve a definite purpose. It must have a directing head who can, through co-operation of the individual units, promulgate the proper plans of action and measure the results in such a way as to serve best the purpose of the institution. To carry these plans to a successful conclusion men are needed with the broad-visioned friendliness to new ideas in order that the promulgated plans may be properly carried into effect. Perhaps practicing veterinarians and those engaged in regulatory work have done most harm by failing to recognize the need and efforts of agricultural extension and refusing to lend its cause sympathetic support. Regulatory officials and practicing veterinarians in many instances have gone so far as to adversely criticize agricultural extension work. This criticism in too many instances is justified.—T. E. Munce.

Without health and stamina of the flock there can be no profit, for profit depends on production, and production, to any great degree can take place only in a healthy body. The life span of the fowl being short, only three years, without the score as in man, and the fact that its body responds acutely, for better or for worse, to environment, make profitable production a problem requiring skill and business tact.—B. F. Kaupp.

One of the Chicago packers is authority for the statement that western sheepmen receive thirty-five cents per hundredweight as the average premium through the year over sheep in the "native" state due to docking and castrating their lambs and for shipping them in uniform weights and types.

Clean bedding helps in keeping animals healthy and comfortable. Animals plastered with manure and filth show poor care and a lack of a dry place to lie. A dirty coat of hair provides a favorable breeding place for microbes and animal parasites, while well-bedded, clean animals thrive much better.—Circular 128, Univ. of Wisconsin.

The very common practice of using the pasture as a burying ground or rotting place for the carcasses of animals cannot be too strongly condemned. The best way is to burn carcasses. Burying, however, is safe if a hole is dug at least six feet deep and the remains are well covered.—Hadley and Beach.

Medicine is usually administered to sheep as a drench. Though sheep are not difficult to drench, it requires both skill and patience to do it properly. Select a bottle with a long neck and a small mouth. Back the sheep into a corner and hold it. Introduce the bottle and induce the sheep to chew by working the bottle back and forth. While the sheep is chewing allow the medicine to run slowly from the bottle. Hold the sheep's head just high enough to prevent the fluid from flowing out of the mouth. A veterinary dose syringe is really better than a bottle for drenching, but is not always available. When neither is at hand, a spoon may be used.—Hadley and Beach.

A Clinical Survey of Simple Distemper*

By G. H. Livesey, M. R. C. V. S.

Sixteen years ago, in discussing certain affections of the skin, I alluded to the exanthem of distemper, and in other papers of more recent date I have also referred to this subject, so that in dealing with it once more and perhaps with the knowledge which comes of greater experience, I shall be bringing to some conclusion the work which has occupied so much of my time and attention during the whole of my professional life. I think the present is a most opportune occasion upon which to put on record and to debate our views as to the true clinical aspect of distemper. For centuries we have been groping in the dark, knowing little or nothing of the disease we are endeavoring to treat; but in the near future there is distinct hope that we shall gain definite knowledge at the hands of those who are engaged in the work of research. When once the causal organism has been discovered and identified beyond dispute, we may look for an entirely new method of procedure with regard to its destruction. When a pure culture of it has been applied to a perfectly healthy dog, we shall then be able to know what are the true symptoms which are peculiar to the presence of that organism alone and uncomplicated by the presence of others. At the present time this matter is in dispute, so that it would be impossible to get a unanimous opinion as to what the true symptoms of distemper really are.

Most of us are agreed that the common type of so-called distemper is the result of a mixed infection, but few agree as to the importance of the part played by the various organisms involved. There are few veterinary surgeons who today believe that they can recognize the pure disease uncomplicated by other infections and can treat it with moderate success, and moreover can recognize complications and sequelæ as such and not confuse them with the original disease. For many years I have held tenaciously to this position, though I have not been able to bring forward convincing evidence in proof of what are as yet merely assertions. To do so one would need to be a wealthy bacteriological research worker, which I am not, my evidence being only that which comes from close clinical observation over a long period of years. So today I repeat that this is a good opportunity to put on record some clinical facts relating to distemper, so that the deductions which may be drawn from them may be confirmed or rejected when the more perfect knowledge is available, which will come from the results of the present research.

From time immemorial, distemper has been recognized as an inflammatory catarrhal fever, and it is scarcely necessary for me to remind you of the classic symptoms which have been described year after year in every book and paper on dog diseases. Briefly, they may be summarized as follows: Rise of temperature, thick muco-purulent discharges from nose and eyes, husky cough, diarrhea, wasting, followed by pneumonia, jaundice, enteritis, convulsions or chorea. These are the commonly accepted symptoms, but of course this is not an exhaustive list of all the symptoms that are recognized. Any person who looks to these symptoms alone as a basis for forming a diagnosis is, in my considered opinion, going to miss the disease in more than 50 per cent of his cases. I think our observation must take us a little further before we can say that we are not dealing with the disease. If we watch carefully from day to day the progress of many of what are considered minor ailments of the dog, we shall notice that there is a similarity in the course that they run, and that, not infrequently, when a time arrives when we can say that the animals are convalescent or cured, they quite suddenly develop distemper, showing two or more of the classical symptoms of distemper, and, moreover, not infrequently the result is unfavorable. The interpretation placed by most practitioners upon this course of things is that the already weakened patient has easily fallen a prey to the infection of the disease; they do not associate the distemper directly with what has gone before. Similarly, in the case of a dog with a trifling cold or cough, or a sharp attack of vomiting and diarrhea, followed in a few weeks by a fit or series of convulsions, it has been the custom not to associate the fits with the previous cough or diarrhea, and many of these cases—they are common enough—are not believed to be distemper at all. I strongly hold the opposite view and always look upon the second phase of symptoms as a relapse, or at least a confirmation of the diagnosis of the original symptoms as being those of distemper.

By watching numbers of dogs carefully over

* Presented at the National Veterinary Medical Association of Great Britain and Ireland Congress, Aberdeen, Sept. 11, 1924.

a long period and making a reasonably careful examination of their bodies and general condition, one becomes struck with the frequency with which one meets certain conditions, and naturally one looks for some cause for these conditions. I do not mean that the dogs are necessarily sick dogs, or distemper cases, but just the typical patients that come into one's hands in the usual course of practice, many of which, of course, are not supposed to be sick dogs in the sense that they have been recognized by the owner as suffering from disease. Many of these dogs, if examined carefully, will be found to be different from normal, and it is quite astonishing to find how far many of them are from normal even when they appear to the casual observer to be in their customary state of health. It is quite common to find a young dog who is perhaps only a little dull or who has not eaten his dinner, but in every other respect quite well and enjoying his walk or exercise, to have a temperature raised 3 or 4 degrees. In the vast majority of such cases no notice is taken by the owner, and it is only by chance that one meets with them. The dog is soon apparently quite himself again. It is later on, and only later on, that distemper is recognized in some form or other. Again, it is surprising, in looking over numbers of dogs, to find how many have the rash of distemper or traces of it on some part of the skin or mucous membrane, though at the same time they may not appear to be ill and the presence of the disease is unsuspected. One becomes more and more impressed with the prevalence of the disease and the almost insuperable difficulty in excluding the infection from healthy animals.

After very careful observation, I have endeavored to tabulate all the symptoms I could recognize in every case, and in every suspected animal, over a long period of years; from the information thus gained I have endeavored to extract those symptoms which were common to all, or at least to the majority. I have not found one which was definitely common to all, but my failure was probably due to the fact that I saw dogs in all stages of the disease, and not always at the onset. The most universal symptom is undoubtedly the exanthema, which I found in some stage of formation in nearly every case. The next most universal symptom, or perhaps I should say characteristic, was some change from the normal nervous balance. This characteristic or train of symptoms is observable in nearly all cases and may be only very slight. A third symptom, which is very common, is a fleck of greyish mucoid material in the inner canthus of the eye. A fourth symptom is a slight nephritis, not always to be diagnosed during life, but generally to be found post mortem. Symptoms such as these may be found in outbreaks, differing widely in their general character, for we know there are many such outbreaks where perhaps in some the general condition may be one of respiratory trouble, while in others the disease is of the typhoid type, whereas in another it may be of the nervous type.

The exanthem I consider to be the most important and the most diagnostic symptom which is ever seen. To my mind its importance and its value in diagnosis cannot be overestimated. More than twenty years ago Mr. Henry Gray drew my attention to the significance of the skin eruption in distemper, and from 1902 onwards I have made as close a study of it as is possible to one in a busy practice. As time went on I became more and more certain that it was pathognomonic, but I could not persuade others that it was so. In 1908 I wrote a paper on the symptoms and diagnosis of distemper and emphasized the importance of this rash as a diagnostic symptom, and I drew attention to it at a meeting of the association, but the only support which I received was from the late Mr. Wallis Hoare who was, I know, in cordial agreement with the views I held. To this day, I believe, the majority are against me when I lay stress on the diagnostic value of this eruption. Eminent practitioners still maintain that it is due to other causes, and it is only comparatively few who would look for it in every case of the disease. Because they have not seen it they maintain that it does not occur. But I maintain that it may be seen in nearly every case, and I shall describe it and deal with it in a later part of my paper. When once seen it puts all doubts at rest as to what the case really is, and when it has been recognized it cannot be mistaken. The nervous symptoms are not so easy to differentiate from those of other diseases.

I should say that the symptoms of distemper, and of distemper alone, so far as I am able to recognize them, are as follows:

1. Rise of temperature.
2. A rash, to be found on the skin or mucous membrane.
3. Disturbance of the nervous system, and probably (4. A nephritis).

All other symptoms are caused either by other causal agents alone or by these in conjunction with the distemper virus. This is the explanation I offer for the wide variety of

symptoms to be observed in outbreaks and in different cases in any one outbreak.

Rise of Temperature

A definite reaction to infection is shown by a rise in temperature. Various authorities place a variable period upon the time that elapses. My experience has been that the rise occurs between the third and fifth days, in nearly every case on the third day; in a few cases, when I could make exact observations, it has occurred from the 65th to 70th hour. The rise is rapid and is generally up to 104°, but I have recorded temperatures of 106°. Subject to the eruption of the rash it may persist for some days or even weeks, or it may rapidly decline, but it generally gradually subsides during the next three days and remains at or near normal for about three weeks. If it has been unusually high and falls rapidly it often drops to subnormal. I have known the temperature to remain above normal for over six weeks without any very marked symptom developing except loss of condition and wasting of the muscles. In this case nervous symptoms followed after three months. On the other hand, I have known the temperature to drop to normal within the space of twelve hours.

At the time of temperature reaction there are usually to be noticed such symptoms as are usually seen in fever cases: dullness, desire for quiet and darkness, temporary loss of appetite, diarrhea and perhaps vomiting. Any one or all of these symptoms may be noticed.

There is one factor which seems to me to have some direct bearing on the fall of temperature, and that is the appearance of the rash. As soon as this appears the temperature drops, and I have come to look upon this as the expression of the infection: a rise of temperature, followed by a rash, and simultaneous decline of the fever.

The Rash

This symptom I look upon as diagnostic. It has been excellently described by Gray in Wallis Hoare's "System of Veterinary Medicine," from which I quote the following:

"The skin lesion is a vesicular pustule containing a quantity of amber-tinted serous fluid, which gives the vesicle a bladdery or pock appearance. It varies in size from a pin's head to the diameter of a split pea or bean, or to that of the small finger-nail. In shape it is sometimes circular, but generally the outline is ovular. The surface is smooth, convex, and usually glistening, and the summit is always flattened, but never conical or umbilicated. It is often surrounded by an areola of a pinkish or purplish color, the remains of the primary circumscribed spot of sub-epidermic congestion. The eruption usually starts in the form of minute red or purple spots, resembling those due to flea bites; but each spot is of a uniform pinkish or purplish color, without a darker center spot. At the end of twenty-four hours each spot appears as a small nodule, slightly raised above the surrounding epidermis; it increases in height and gradually fades into a clear amber-tinted vesicle. Its maximum size is attained on the third or fourth day, when it ruptures and the contents escape. The latter, in conjunction with the thin superposed layer of epidermis, dry up and form a thin scab, which generally becomes displaced, a small moist, slightly granular surface being left, which gradually fades away by the fifth or sixth day. On pigmented skins a clear or even blackish circular spot or cicatrix often remains for some time after all other traces of the eruption have disappeared. Occasionally small abraded surfaces remain, and for some time discharge a greasy thin material, which usually decomposes and gives off a very nauseous odor. The eruption is rarely pustular in character; it usually involves the deeper layers of the epidermis. The surface of the dermis being vascular in the dog, confines the lesion to the parts mentioned. Occasionally, however, the eruption becomes pustular, involving the dermis, and leaving permanent, indelible cicatrices, which have a glistening surface and remain bald for life. This condition has been now and again observed by the writer. In other instances minute vesicles occur, which exude a yellowish serous material. This dries up, and gives the skin an appearance as if a dry adherent material containing sulphur, or the yolk of an egg, had been applied to it.

"The eruption varies as regards the number of the vesico-pustules present. In some instances from one to three or more are observed, and occasionally they are spread all over the body, even invading the auditory cavities and the nasal, buccal, bronchial and anal mucous membranes.

"The usual seats of the eruption, however, are the almost hairless skin of the abdomen, inside of the thighs, and sometimes inside the arms, and not uncommonly on the scrotum, perineal region, the inside of the flap of the ear, and in the female on the labia of the vulva. Renewed crops of the eruption may be observed in some cases, and while one set is disappearing, another is appearing, this process continuing until convalescence is reached. When the vesico-pustules are few in number, they are

generally discrete; but when very numerous, they may coalesce and form a large oozing surface, which gives off a thick exudate that mats the hairs together. At other times extensive ulcerating surfaces are left on various parts of the body, which become encrusted with scabs and emit an offensive odor.

"Pruritis is generally absent in cases where the eruption is confined to the usual seats of its election; but when the eruption becomes generalized, intense pruritis is observed, the animal constantly scratching the affected parts to such an extent that the case may be mistaken for one of eczema or sarcoptic mange.

"Exposure to chill, inclement weather, or any other adverse influences during the time that the eruption is likely to appear, may cause it to be suppressed or to become aborted.

"When the eruption appears early in the complaint, and is unaccompanied by any serious complication, it is usually a favorable sign, and provided the animal be treated rationally, recovery generally results.

"If, on the contrary, it appears late in the attack, when the animal has become prostrate from a serious complication, it is rather a grave prognostic—at least, one would, as a rule, regard it as such.

"In very malignant outbreaks, sometimes the whole of the skin has an abraded appearance, and discharges a profuse serous material, which is often so abundant that it wets the bed or ground on which the animal lies, and gives one the idea that the animal is sweating freely. The secretion has a very nauseous odor, and is usually the forerunner of death."

To the above vivid description I must make some additions. In the first place the rash is by no means always vesicular. I have frequently seen it appear as a mere erythema—a genuine flushing of the skin and a deeper coloration of the buccal mucosa. Appearing in this way it is generally ephemeral. Again, it may be punctiform in appearance and might convey the impression that the patient had been bitten by fleas, harvest bugs, or other insects. It is by no means confined to the hairless parts of the body, but is, of course, best seen in those situations. In a few cases I have seen it in the form of small purplish patches. In such cases vesication does not always follow and the rash is very transitory. Vesicles may form and do form in as short a time as two hours. They generally form in less than twenty hours. They may rupture and dry up also in two or three hours, but they may persist for three or four days. In those cases where they have formed and dried up very quickly, they may easily have been overlooked, but they leave a distinct trace, such as a darkened areola or small spot covered by brownish skin debris, which is very easily mistaken for dirt. If washed away a very small depression is seen below, which is whiter than the surrounding skin. When they occur in situations where they are subject to chafing—as between the hind legs, on the scrotum or, particularly, on the skin where it is reflected on the vulva—the discharge causes at times irritation and the part consequently is licked by the patient. The condition is then generally confused with so-called eczema. It has, however, a rather characteristic smell. A similar condition is seen inside the ear and this may be confused with canker. It should be noted that the rash is not confined to the skin, but may be seen on mucous membranes, particularly the mouth and the vulva. In the mouth it appears on the gums and the inside of the lips, two common locations being the back of the buccal pouch and just below the lower canines. On the tongue it is seen on the lower part of the sides of the attached portion. It may also be seen on the soft palate and in the pharynx.

I have never seen vesicles on the eyelids, but I have often seen red spots on the conjunctivæ and I think it is reasonable to infer that these inflamed spots may produce vesicles which, if they are situated on the eye proper, would rapidly be ruptured by the eyelid, and the break of continuity thus resulting may be the starting point of the troublesome ulcers which we find so commonly in distemper cases. In any case they may account and, I think, do account for the conjunctivitis which is one of the common early symptoms recognized.

The rash being visible on the mucous membrane of the mouth, it is possible that a similar process may take place on other mucous membranes, as, for instance, that of the stomach or bowel, and I have often suspected that this expression of the disease may be the starting point of the diarrhea and even the broncho-pneumonia, which are such frequent symptoms. Would not such breaks in the continuity of the bronchial mucous membrane provide a most suitable nidus for the development of the B. bronchisepticus? In support of this suggestion I can say that I have repeatedly noticed that if any measures are taken to suppress the rash or if it is suppressed by exposure to cold, there is a rapid response shown by diarrhea or broncho-pneumonia, or an exacerbation of either of these symptoms. On the other hand, if the rash is encouraged, and in those cases where it

is early in its onset and profuse in character, the disease is more likely to take a favorable course.

The question arises, at what period after infection is the rash to be expected to appear? I have not been able to satisfy myself on this point, as I have noted such variation in the period. In a large number of cases it will be seen a fortnight after infection. I would not deny that it may have appeared sooner, and I would agree that it sometimes is delayed beyond the fortnight to the third week. It is here that research may be able to help us. Probably the varying resistance of the body tissues in different patients may account for the varying period, the weaker dogs showing a rash sooner than the stronger; possibly also the partial immunity acquired from previous infection. A further factor may be the presence or absence of some other form of bacterial life which may hasten or retard or may even destroy the distemper virus. There is no doubt at all that the "third factors" play a very important part in the development of the disease and at present we do not know to what extent distemper is dependent upon these "third factors" for its virulence.

It is of interest to mention here that the rash may be seen on puppies before they are a week old. I have frequently seen crops of vesicles as early as the fifth day. At what previous period were these puppies infected? Did it occur in utero or immediately at birth? That they are infected I have no doubt at all. Some of them die very suddenly, some waste and die without leaving any symptoms observable at post mortem, and those that survive show a remarkable resistance to subsequent infection for a long period. My belief is that the mother is a "carrier" and the puppies are infected in utero.

Nervous Phenomena

These I believe to be entirely due to the virus of pure distemper. There are many cases in which they are the only symptoms observed during life, and they frequently occur before complications have time to develop. When they do occur, they leave a more or less permanent mark upon the patient, which may be demonstrated in many ways. The effects, no doubt, would be more marked if the dog had a more highly developed brain, but when we consider the degree of intelligence the dog possesses we cannot but mark the deterioration in it which is to be noticed after distemper. The senses are often dulled and this is observable in those sporting dogs where the scent is highly developed. Pointers and setters are good examples. Toy dogs become stupid and lethargic, and many dogs become irritable and snappy or intensely nervous. Where the locomotor nerves have been affected, we find a slight dragging of the feet, the claws not being worn evenly, or in more advanced cases, a catching of the toe with consequent wearing down of the front of the nails. Frequently there is a degeneration in the eye. A form that everyone recognizes is chorea. But a partial paralysis may result, and remain permanent. There is something suggestive in many of these cases, of encephalitis lethargica of humans, of scarlet fever and of measles.

There are, however, acute nervous symptoms which are only found in distemper, or following upon it. These may be summarized in the word chorea, for chorea is not seen in any other affection of the dog, and, so far as my knowledge and observation go, it is peculiar to the dog. It is generally ushered in by one or more convulsions, and these may occur at any time in the course of the disease. They are certainly most difficult when they appear early, when they may be the first sign noticed that anything is amiss. Meningitis and death too often rapidly follow. On the other hand, the first symptom noticed may be a progressive stupidity resulting in coma and death. Either kind of symptom signifies, I think, a nervous intoxication by the virus. The predominance of nervous symptoms is, in my opinion, a measure of the strength of the virus and therefore serves as a warning of the severity of the case.

It would appear that there are occasionally outbreaks of distemper which are of exceptional severity. There is no doubt as to the intense virulence of the infection. It is not an ordinary virus attacking a susceptible individual, or a weakly litter, because its effects are seen amongst all and sundry over a wide area. In such outbreaks one will notice the effect upon strong young puppies; it will be well seen in young hounds out at walk. Many of them are seen to be taken ill and to die within twenty-four hours, and practically nothing is to be seen by the naked eye on post mortem to account for death. By watching the cases that recover, one is able to identify this septicemia with distemper. Of the cases that do not die outright, one meets many cases in which the first symptom which has been observed is some convulsion or screaming fit, after which death may rapidly follow—too often hastened, unfortunately, by the patient being dosed for worms. In other cases there is merely a progressive emaciation,

with increasing apathy passing into coma and death. In these cases the most noticeable feature on post mortem is the state of the mouth, which is foul and discolored, and the excessive thinning of the bowel and stomach walls. These symptoms point to the infection being septicemic and showing its effect principally upon the nerves. In the cases of emaciation the trophic nerves as well as the higher centers are involved. If the case lasts over any time, when continuous observation is possible, the skin eruption may be identified.

I think that the great difficulty of successfully treating this type of case is explained by the fact that it is in these cases that we have the greatest virulence of the disease.

Nephritis

I have not made sufficient post mortem examinations to enable me to come to a sure conclusion as to the invariability of this symptom. Nephritis is notoriously difficult to diagnose during life in the dog; but after death it is a condition which is almost invariably seen in dogs over six to eight years old. It is found as chronic interstitial nephritis. Why should animals which have lived healthy lives and existed for so short a time as eight years show signs of such a pathological condition? There must be some cause, and arguing from the fact that distemper is a blood infection, a septicemia, and that in such infections the kidneys are very liable to become pathological; also from the fact that few—if any—dogs escape distemper infection, I think it is reasonable to infer that the nephritis has resulted from the distemper virus. This is a speculative suggestion on my part and I hope it will receive some consideration.

In my opinion, this nephritis is responsible for many cases of progressive opacity of the crystalline lens and also for the hairless and often warty condition of the skin of the back, each of which I have frequently heard described as resulting from distemper, and which undoubtedly are frequent sequels to the disease.

Infection

I think I am right in saying that the universally accepted theory up to the present has been that the virus gains entry to the system by way of the respiratory tract and particularly by way of the nasal mucous membrane. I do not agree with this theory, even though it is quoted by eminent authorities in all text books. The special mucous membrane on the nasal pads of the nose is Nature's protection to the more delicate membrane within the nose, and I believe little or nothing gets beyond it. When infection does get to the inner parts of the nose, I think it gains access by means of the lachrymal canal and sometimes the naso-pharynx. The onset of the disease following upon the smearing of infective material on the nose, does not point to the infection travelling by way of the respiratory mucous membrane. Anyone who has any knowledge at all of dogs knows quite well that immediately anything, liquid, solid or gaseous, is applied to the nostril, the dog will lick it off with his tongue and transfer it to his mouth. A healthy dog will always keep his nose pad clean, and if anything enters the nostril he will sneeze at once and again there will be much licking of the nose. This leads one to suspect that the common mode of infection is via the mouth; and the suspicion is, I think, confirmed by clinical evidence, for I am satisfied that those cases do best where the mouth is kept scrupulously clean. I go further and say that if you can keep healthy young dogs quite clean in the mouth by the use of such agents as hydrogen peroxid or other searching antiseptic, you are taking the most certain measure that I know towards the prevention of distemper. I have found it of greater general value than inoculations, and I should expect to do so until the true cause of the disease has been found. I certainly have found that disinfection of the mouth is one of the first principles of treatment, and perhaps the most reliable, and I shall refer to it later in this paper.

I do not judge, from my own observation, that the infection is carried to any great extent except by the living animal. The disease is more contagious than infectious. Disinfection of premises and utensils is easy. Dampness favors the retention of the virus, but sunlight, cool, fresh air and dryness seem to destroy it readily.

I am sure that the infection can cling to a living dog long after all clinical symptoms have passed and further than that, a dog that has an immunity may also be an indirect source of infection to others. There are many such. There are also dogs that have had previous attacks of the disease and which after further infection develop the rash, but no other symptoms, and to all appearances are quite well, but which are capable of transmitting the disease to a susceptible subject. All these dogs must be looked upon as "carriers," so that one can readily understand the widespread nature of the disease and the almost insuperable difficulty in checking it. Another fact that must be remembered is the persistence of the infection.

A dog recovered of the disease, that is, in which there are no longer clinical symptoms, may and often does carry the infection up to twelve weeks; that is to say, that when once a dog has been infected, one cannot say that he is safe from a relapse, nor is he safe as a possible source of infection to others for three months, though he may be reasonably so after six weeks. I have repeatedly seen obscure nervous symptoms follow a mild attack and chorea develop as long as three months after the first infection. How far the secretions and excretions are the media for the transmission of virus I am not able to judge, but I have always distrusted dogs that licked themselves excessively and those whose bodies had a clammy feeling about them or whose skins were inclined to be moist.

A matter of interest and importance regarding the spread of infection is that a dog is most infective in the early stages of the disease when the temperature is raised, but before any diagnostic symptom is visible. At this stage, before the eruption of any rash or the onset of husky cough or other secondary symptom, he may be and probably is allowed to mingle freely with other dogs spreading infection to all and sundry. The virulence of the infection seems to me rapidly to decline, and there are many cases two or three weeks old with severe symptoms of respiratory catarrh, which seem apparently bad cases of distemper, but which I think are not always very dangerous to other dogs.

If the above assertion is correct, as I believe it to be, it demonstrates again the almost insuperable difficulty in controlling the spread of the disease. Those who have experienced the rapid spread of measles and whooping cough amongst children will see a similarity in the spread of distemper, for both these diseases are very infective before diagnostic symptoms appear. When a dog develops diagnostic symptoms of distemper, especially when an inmate of a breeder's establishment, it is to all intents and purposes too late to prevent other cases developing, as the infection has been passed on before anything has occurred to arouse the suspicions of the owner. It is well, then, to bear in mind that fresh cases are most infectious and to put a period of quarantine on all new importations into a kennel. It is only by such methods that the very high mortality amongst hound puppies can be lessened until we have some specific protective serum or vaccine.

Treatment

I have very little to say on this all-important subject. At present there is no specific, and I have none to offer. A very great number of biological products have been advocated, and many are in use at the present day, but none is specific. Some that have won reputation have beneficial results in some outbreaks, and amongst these, those prepared from the B. bronchisepticus have proved of great service in the hands of some veterinarians. This I think one would expect, for there are undoubted outbreaks of the disease in which the bacillus plays a great part, and it is present in the majority of cases.

But the distemper associated with the B. bronchisepticus, and described by Ferry and his school, is not the distemper that I have in mind in writing this paper. My conception of distemper and Ferry's differ very greatly, for I look upon the disease described by him to be true distemper plus the symptoms induced by its association with the B. bronchisepticus. In Ferry's distemper the B. bronchisepticus is probably a "third factor." I feel sure we must look for causes beyond this bacillus, and one cannot but believe that the true cause will be found amongst those organisms classed as "filtrable." If I am right, then we must wait for its identification before we can hope for any serum or vaccine that will be efficacious. There may, however, be some hope for the dog world if we can obtain a vaccine from another filter-passer which will confer immunity, or we may be able to find some other organism which is destructive to the distemper virus. I think these lines of research may possibly lead to useful results. In man, cowpox confers a useful immunity from small pox; why should not the virus of such a disease as foot-and-mouth confer a useful immunity in the dog to such a disease as distemper? I am informed that it is a recognized fact that foot-and-mouth virus will produce a vesicular eruption in the dog, similar to that of distemper; possibly other filtrable viruses might do the same and one of them, at least, might be found which would protect against distemper. But this is speculation, and I leave it in the hands of bacteriologists.

Biological treatment being independable, we are thrown back on our former resources. By far the most satisfactory method of treatment that I know and one which I can confidently recommend is dependent to a great extent upon early recognition of the disease. When a diagnosis is made before complications have set in, and if the infection has not been of an ultra-virulent type, it is almost always quite successful. It is very simple. Keep the mouth, teeth, gums and lips as scrupulously clean as possible by swabbing out with peroxid of hydrogen.

It does not matter if some is swallowed by the patient. The dressing should be carried out two or three times a day, or more often if the mouth is at all foul. Feed on unboiled milk. If the dog will drink plenty of it and take it voluntarily, he will make a good recovery provided ordinary care is taken of him. No medicine of any kind is required or, in my opinion, is of any use, to combat the infection, except perhaps some internal antiseptic, and of these the most useful are hexamine and dimol. The patient, however well he may seem, must be treated as an invalid and go through a long convalescence, and during the whole period absolute quiet and rest should be secured. Noise, excitement, fear, loneliness and other factors affecting the nervous system are as dangerous as, or even more so than, cold and wet. Warmth is not necessary, but an equable temperature is essential, even though it be between 40° F. and 50° F. It must be kept in mind that in this paper I am not dealing with complications or secondary infections, though, even when these occur, it is astonishing how cases improve when proper attention is paid to the mouth. If any untoward symptom, however, should arise and the use of drugs be called for, treatment should be of the simplest, and care taken not to interfere with the voluntary taking of milk. If the temperature be subnormal then some stimulant may be necessary—camphor is useful.

Skin lesions should be left alone, or at least only dusted over with dry dressing. But if severe conjunctivitis is seen, or if there is much shunning of light, the eyes should be frequently dressed with some mild antiseptic such as weak peroxid, chinosol or boric lotion made astringent with sulphate of zinc.

I am not presuming in a short paper to deal with all the phases of the disease and I should prefer to keep the subject of treatment out of it, but I have written shortly what I believe to be the best method, not with the intention of touching upon therapeutics, but rather in the hope that the methods may, by the success which follows their use, go a long way to confirm the assertions which I have made in the earlier part of the paper.

Sweating Sickness in Calves

The following descriptions are taken from the 9th and 10th Reports of the Director of Veterinary Education and Research, Department of Agriculture, Union of South Africa.

The particular disease in question was investigated by P. J. DuToit, B. A., Ph. D., D. V. M. The popular term, "sweating sickness," owes its origin to the most noticeable symptom of the disease; a profuse perspiration over parts of the body. The visible mucous membranes may also be affected. This disease has been observed in different portions of Africa for the last five or six years. It is apparently becoming more prevalent in certain areas each year. The cause of "sweating sickness" is still obscure, and although various experiments have been conducted, no definite etiologic factor has thus far been identified; however, there are good reasons for regarding sweating sickness as an infectious disease. The prevalence of the disease is apparently not influenced by rainfall or altitude, but it has been noted that it is most prevalent during the warm season.

From the available facts, it is possible that the disease is transmitted by means of some sort of carrier. There is a host of sucking and biting flies, as well as ticks in most of the areas in which this disease has been found and it has not been found to incriminate any particular species of parasite as carrier.

Symptoms

The disease has a sudden onset, at least in the majority of cases. A calf may appear perfectly healthy in the evening and show pronounced symptoms early the next morning. The affected animal is dull, has drooping ears, sunken eyes and staring coat. The temperature in the beginning is always high, in some instances the maximum reaching 108°F or even more. The body skin feels warm but the extremities are cold. In most cases, sweating sets in at an early stage. The areas that perspire freely are the cheeks, the nose, the base of the ears, cervical region, the areas behind the elbows, the flanks and the inguinal region. In most severe cases, the skin all over the body may be involved. Actual sweating, that is, the beads of perspiration on the hair, can generally be seen in early morning only. The hair in the area where perspiration is excessive is often loose and can be pulled out easily. When the hair is removed the epidermis usually remains attached, leaving the dermal surface denuded.

The affected skin area becomes very sensitive and the patient usually seeks shelter to protect itself from the sun's rays. In those cases in which the disease persists for a few days there may be a faint, sickly, sour odor emitted from the skin. In the early stages there is usually lacrimation and salivation and there may be conjunctivitis. On viewing the buccal mucosa it is found in the majority of cases to be red and later erosions may be observed. In some cases severe erosions with a diphtheritic pseudomembrane have been observed on the inside of the lips and on the base of the tongue. These lesions of the mouth interfere with suckling and eating and thus such cases do not eat. There may or may not be a serous discharge from the nostril; the circulation apparently remains normal, and there is no noticeable change in the nervous system.

Disease Usually Acute

This disease is usually acute and in fatal cases death occurs two to four days after the onset. In the known fatal cases, the symptoms abate in about one week and recovery will be complete in from one to three weeks. Some calves are practically devoid of hair when they recover and new hair appears very slowly. Even the brush of the tail may be lost.

Lesions

The gross lesions prevailing in cases that have terminated fatally are as follows: The skin lesions vary from an acute dermatitis to a hyperkeratosis and necrosis. There is an alopecia, or absence of hair, and rough scales of epidermis. Some cases have been observed in which there are small vesicles. Mucous membranes, particularly of the mouth, may show changes similar to the lesions of the skin. Small hemorrhages may be observed in the kidney. Various microscopic lesions may be observed.

The above disease has been discussed rather in detail, believing it would be particularly interesting, as it apparently has not been identified as such in America. The disease is possibly very similar to dermatosis induced by certain vegetable foods such as clover, lupine, etc.

Antirabic Vaccination of Animals *

By S. Kondo, Veterinary Laboratory, Ministry of Agriculture and Commerce, Nishigahara, Tokyo, Japan

Although antirabic vaccination is commonly practiced on men everywhere in the world since the time of Pasteur's conclusive experiments on the preventive inoculation, there was no method of vaccination against rabies in animals in practice owing to the expense of the treatment and due to its uncertainty.

It was T. Oshida who, in 1915, first demonstrated in our country that an emulsion of fresh fixed virus could be employed for immunizing the dog against rabies. He obtained some satisfactory results by subcutaneous inoculation with a 10 per cent emulsion of fixed virus. Later, Dr. S. Umeno obtained a vaccine by keeping an emulsion for two weeks at room temperature. He prepared the emulsion by grinding one part of the central nervous tissue in five parts of a mixture of 60 parts of glycerol and 40 parts of 1.25 per cent phenol. He reported that the practical application of this vaccine on 104,629 dogs in Tokyo and Yokohama showed only 41 of the inoculated animals developed rabies while 1,699 of the uninoculated group contracted the disease.

It is very interesting that these results were confirmed in America. In April, 1922, and March, 1924, Drs. A. Eichhorn and B. M. Lyon published the results of the single immunization experiments against rabies in dogs, which fully confirmed the results obtained by the Japanese investigators.

Several years ago I also started investigations on the preparation of an efficacious vaccine applicable to animals. In my preliminary experiments the brain and spinal cord taken from the rabbit or the dog inoculated with fixed virus and killed when completely paralyzed was ground up in a mortar and emulsified in a proportion one to five. This emulsion was used for the experimental study immediately in a fresh condition or after exposure to different degrees of temperature in an attenuated form. The results of the experiments I have obtained are summarized as follows:

1. The vaccine containing entirely fresh virus is not applicable owing to danger to the animals. About 10 per cent of the dogs vaccinated with such fresh virus contracted rabies.

* Presented at the Meeting of the Hudson Valley Veterinary Medical Association jointly with the New York County Veterinary Medical Association and the Hudson County Veterinary Medical Association at the Lederle Antitoxin Laboratories, Pearl River, New York, on September 24th, 1924.

2. Vaccines containing an attenuated virus which is prepared by incubating the emulsion of the central nervous tissue from animals infected with fixed virus at 37° C, for three days or prepared by keeping the emulsion at room temperature for 10 days are most applicable for vaccination of animals.

3. The vaccine prepared by incubating the emulsion at 37° C, is better than that prepared by keeping it at room temperature, because more uniform attenuation of the virus could be expected from the former treatment.

4. The vaccine prepared from the brain and cord of dogs proved more suitable than when obtained from rabbits, for the reason that it is less expensive.

Since it was ascertained that the inoculation of the vaccine prepared by incubating the emulsion of the brain and spinal cord at 37° C, for three days conferred a solid immunity to the animals treated, the vaccine has been employed in practice on dogs in Hokkoido, Tokyo and ten other prefectures. The number of animals vaccinated from June, 1919, to February, 1921, amounted to 20,117 without loss due to the treatment. Four dogs died within a week from natural infection which occurred before the vaccination. No cases of rabies developed among the dogs vaccinated for about one year after treatment, notwithstanding the fact that many cases of rabies occurred among the unvaccinated animals.

Although at the present I have no accurate statistics on the number of vaccinations, certainly more than 200,000 dogs have received the prophylactic treatment since March, 1921.

Method of Preparation and Use of My Rabies Vaccine

For the preparation of the vaccine, dogs are injected intracranially with a small amount of fixed virus of rabies. After complete paralysis (in five to six days) the dog is killed and the brain and spinal cord are removed, ground up in a sterile mortar and emulsified by adding a solution containing 0.5 per cent phenol and 50 per cent glycerin in a proportion one part of the tissue to five parts of a solution. The emulsion is filtered through a sterile linen cloth, filled in 100 cc vials and then incubated at 37° C. for three days. Following a virulence test the vaccine thus prepared is then ready for vaccination of animals.

Dosage

Depending on the weight dogs are injected subcutaneously on the back or posterior to the shoulder with 3 to 5 cc of the vaccine. The point of injection is disinfected by applying a 3 per cent phenol solution, or alcohol. For sheep and swine the dose is about 4 to 5 times the dose for the dog. Cattle and horses receive about 10 times the dose for the dog.

Dr. S. Kondo, of the Veterinary Laboratory, Ministry of Agriculture and Commerce, Nishigahara, Tokyo, Japan, who has been actively engaged for seven years in investigations on the control of rabies in dogs.

Recent Developments in Our Army Veterinary Service

By Robt. J. Foster, Major, V. C., Fort Riley, Kansas.

The present army veterinary service which is virtually a reorganization of that service during the World War, was brought about by the definite and complete set of army regulations published in 1920-22.

Here for the first time the army promulgated orders setting forth, for the entire service a complete regional nomenclature covering every part of the exterior of the horse, a standard description of colors and markings and a list of diagnostic and surgical terms, so that reports could be standardized.

Having standardized for army use, the various parts of reports, a complete set of reports has been inaugurated, which will in the course of time, give to the veterinary profession some very valuable data concerning animal casualties and statistics.

Every morning the commanding officer receives a morning report from every organization as to men present, absent, etc. The surgeon sends also a morning sick report showing the men of the command who are incapacitated for duty by sickness. Since the war the veterinarian also makes out and forwards to headquarters, an animal sick report, which gives the number of animals according to organizations, that are on sick report, those admitted and those discharged during the past 24 hours and at a glance the commanding officer is able to know how many animals are incapacitated for duty. This report is forwarded to Washington daily and in this way the War Department can determine the daily status of their animal population.

It is, to be sure rather unfortunate that the army veterinary service was not organized and functioning at an earlier period, when horses formed a larger part of the civilian practitioner's interest.

The post war developments then concern first the organization of the veterinary corps into a going concern and how that organization is accomplished by the system of reports prescribed.

Reports Now Being Used

Animal Casuality Records. Every public animal that is incapacitated for duty by reason of disease or injury, is entered on sick report and a record card made out for the case. This card covers the animal's description and age, estimated years of service, name of disease or injury, complication and sequelae if any occur during the time on sick report, date case disposed of, either by recovery, death or otherwise, if by death, autopsy findings and number days in hospital. From these cards a complete summary of all diseases, classified injuries, etc., is made in the Surgeon General's office.

Monthly now each station submits to the Surgeon General two statistical reports, one for noncommunicable and the other for communicable diseases. The non-communicable disease report covers the number of animals remaining on sick report from the last report, number admitted during the month for (1) diseases, (2) for injuries, total number returned to duty, those died and number remaining on sick report at end of month.

For the communicable diseases report the diseases are classified into groups and the number admitted under each group, those returned to duty, those died and remaining are noted.

From these reports, each station veterinarian figures the percentage of his animal strength that are on sick report, etc.

A consolidation of these reports in Washington provides the Surgeon General with current figures as to the status of all army animals. Such statistics become more valuable the longer the period they cover and will become an invaluable asset to the veterinary profession in years to come.

Sanitary Reports. It is a better business policy to keep well animals well than to have to treat them after becoming sick. The veterinarian is now, as a result of war experiences considered as an expert animal sanitarian. He is consequently required to make daily inspections of all stables and surroundings with reference to their sanitary condition, including feeds and feeding, watering, stable management, grooming, care of feet, saddling and harnessing, etc. Monthly he must make a written report to the post commander with reference to all of these things. He makes recommendations to immediate organization commanders at any and all times whenever a condition is found to exist that should be changed, which would or does affect the health of the animal.

Horse Purchasing. There has been no change in the horse purchasing procedure.

Veterinarians however, are probably more essential for this work now than ever before, owing to the scarcity and poor grade of animals available to select from.

Breeding Activities. Since 1920, Congress has annually appropriated on an average of $200,000 or more yearly, to further the breeding activities inaugurated by the remount service. Here the service of veterinary officers specially qualified in breeding problems are in demand and most essential. The remount service maintains at present, over 300 stallions that are used for the breeding of animals for army purposes.

At the remount depots, the army is also endeavoring to breed a few selected mares in an endeavor to produce better cavalry mounts. Here the services of our veterinary officers are very important.

Forage Inspection. For the maintenance of 40,000 to 50,000 horses and mules, the matter of forage is a considerable item. Here for almost the first time the army veterinarian plays an important part.

My first experience with this post war activity was with the A. F. in G. There the German government furnished all the hay, oats and bran for the animals of the American forces. There was an average of 2,000 animals in the force during my service there. Every carload of hay, oats or bran was inspected by a veterinary officer and reported upon before the quartermaster would accept it. It was a frequent occurrence to reject carloads because of poor quality.

In this country at the present time the Quartermaster Department lets contracts for each post and as a general rule the hay, oats and bran are at the post ready for delivery with only the contractor's assurance that the specifications of the contract are being fulfilled. At Ft. Riley, there were many complaints with reference to the grade of oats being received and shortly after my arrival, a careful grain inspection was inaugurated in accordance with the order prescribed in army regulations. As a result the first three cars on the last contract were rejected as not meeting the grade. Of course the contractors objected but our inspection report covered, weight per bushel, color, foreign material, other grains, heat damaged grains, sound oats, and it held. Needless to say we are now getting oats up to standard. The army thereby gets what it pays for.

Condemnation of Public Animals. The purchasing of horses and mules is similar in practically all armies. The line or staff officers form the board, with a veterinary member who passes judgment on the soundness. Therefore the interested purchasers are the line or quartermaster officers who do the actual buying and their veterinary advisors.

Purchasing is one act and getting rid of them when unfit for further service is quite a different matter.

The British Army seem to have solved that problem quite satisfactorily. When a horse or mule is of no further use, it falls into one of two classes. (1) Condemned for pathological reasons; (2) those condemned for other reasons.

1. All animals unfit through pathological reasons are turned over to the veterinary service for condemnation by them and charged against this service. The veterinarian was a member of the board.

2. All animals unsuited for non-pathological reasons are turned over to the remount service for them to condemn and charged against their record. Rest assured that under such a system no animals are condemned unless actually unfit and each service sees to it that it only condemns those which come within its province.

In our service, formerly the veterinary officers had absolutely nothing to do with the condemnation of animals. Sometimes it happened that the inspecting officer would ask the veterinarian's advice with reference to some particular animal, though rarely, and animals were condemned for any and all pathological conditions imaginable whether they had them or not.

Not so now however. No animal is now presented to an inspector unless the animal has first been examined by a veterinary officer if one is available. A report of the examination is made in writing and when animals are condemned for pathological reasons, they are actual and not fictitious. The inspectors so far as my experience has gone since the war, accept almost unconditionally the opinion of the veterinary officer as to whether or not the animal should be condemned. This is a very important step in the handling of our animals. I don't think it is as satisfactory as the British method.

Meat and Dairy Hygiene Service. Before the war there were a limited number of veterinarians hired by the quartermaster corps to inspect their meat food purchases but these men were only at the larger purchasing centers and responsible only to the quartermaster corps by whom they were employed.

In the post war development, this service

has been considered from the standpoint of protecting the health of the troops and as an adjunct of human sanitation. As a consequence this department has become a very important part of our service and one that the army at large is coming to depend upon more and more for advice.

It develops itself into (1) an examination of meat, meat food and dairy products at purchase in the larger packing centers, (2) the examination of these products at receipt and issue in posts when they are bought independent of the large army purchasing points, (3) dairy inspection for dairies supplying milk to army posts.

It must be recognized that an army of 125,000 men consumes a considerable amount of meat and meat food products. It therefore doesn't take much imagination to realize that this section of the veterinary service is one where special professional training is needed.

These products as you know are all bought according to specifications as determined and published by the Quartermaster Corps. The function of our service is to see that these specifications are lived up to and that none of the products of inferior quality or grade are accepted. In other words that the army gets what it pays for in quality and soundness.

Before the war the quartermaster veterinary meat inspectors were only at the large purchasing centers. All meat bought where there were no inspectors was accepted without inspection as the army veterinarians of cavalry and field artillery were not concerned with such duties. Now that this work is a definite part of our service, no meat is purchased anywhere or issued to troops anywhere without first being inspected and passed upon for quality and soundness. Post commanders and local quartermasters are very insistent upon the careful carrying out of this work.

Monthly every veterinary officer compiles a complete report covering his activities along these lines. This report covers ante and post mortem inspection in places where the federal B. A. I. does not do it, inspection to comply with specifications, inspection at storage and issue to troops.

Laboratory Service. During the war a veterinary laboratory service was organized for the first time. Major Gilliland of the Gilliland Laboratories was the officer in charge and the laboratory was established at the University of Pennsylvania, through the loan of suitable rooms and equipment. Here most of the mallein was made and from this laboratory the tests were conducted which finally led to the adoption of the intra-dermic mallein test for the army.

The Medical Department had a very complete system of laboratories organized for their service before the war with the main laboratory located at the Army Medical School, Washington, D. C. As soon as hostilities were over and the war time army started to disband, the veterinary laboratory at Philadelphia was moved to Washington and made a section of the Medical Department laboratory service.

This service has been developed to the extent that our corps has one or more veterinarians constantly in training at the army medical laboratory, as laboratory specialists and in each of the principal medical department laboratories, we have a veterinary section in charge of a specially qualified veterinary officer. These laboratories make all the biologics and diagnostic sera used by the army veterinary corps as well as afford facilities for laboratory diagnosis for all veterinary officers in practice.

The Army Veterinary School. During the war a school for the training of veterinarians in meat inspection was organized and maintained at Chicago. It was of three months duration. This school was purely a war product and had no permanent standing. With the post war reorganization the War Department authorized an Army Veterinary School, made the course of five months duration and to include instruction for selected enlisted men as well as officers.

The present status of army veterinarians being that of commissioned officers, they are also required to have all the basic knowledge and training, pertaining thereto, in addition to their professional knowledge as veterinarians.

It used to be that after years of close association with regimental officers, regimental veterinarians did gradually absorb this training but such a procedure would not do at this time. A veterinarian now is supposed to and must know the military duties pertaining to his official status.

Consequently it developed that it was essential to provide a course of training for all veterinary officers that would include military art as well as special military veterinary training.

This necessitated lengthening the course to nine months duration and changing its location. Now all medical, dental and veterinary officers ordered to school go to the medical field training center at Carlisle for four months military training.

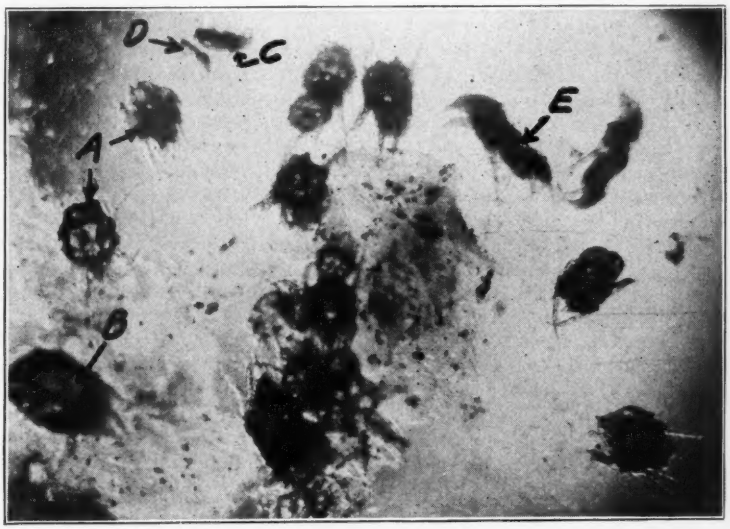
Auricular Scabies of the Rabbit

By B. F. Kaupp, Chairman, Poultry Group; Poultry Investigator and Pathologist, North Carolina State College, Raleigh, N. C. Author, Animal Parasites and Parasitic Diseases, Poultry Diseases, Anatomy of the Domestic Fowl, Poultry Culture Sanitation and Hygiene, and Essentials of Poultry Raising.

Auricular scabies, commonly called canker by rabbit breeders, is by no means rare. It is due to a species of scab parasite and is easily controlled by the usual methods employed to control scabies among larger animals.

History of This Case

We hear very little these days of real study of diseases of rabbits, though the rabbit is entitled to its share of attention from the investigator the same as birds and the larger animals. It is rare to see, as in this case, two small boys bringing their pet rabbit into the laboratory with the announcement that the animal has sore ears and they want to know if it can be cured. Upon examining the animal, it was observed to have what they called ear canker with the information that many of the rabbits of the hutch, from which it came, had this trouble. On looking into the conchal cartilage, or outer ear, it was observed to be covered with scabs some of which were loosening and were easily removed.



Psoroptes Communis Variety Cuniculi. A, the Male; B, the Female; C, side view of Female; D, side view of Male; E, Male and Female in State of Copulation.

Identification of the Parasite

The parasite was found among the scabs, which were scraped from the ear and examined under the microscope. The parasite was identified as the Psoroptes communis variety cuniculi, and the disease as otacariasis.

"This affection was first reported by Delafond[1] at a meeting of the Societe Centrale de Medicine Veterinarie, on December 9, 1858. On this discovery he made inquiry among the rabbit dealers in Paris, who informed him that the affection was frequent, and interfered with the growth of the rabbits. It is, in fact, very common, and nearly all those who have previously looked for it have found it."

The writer would like to inquire through "Veterinary Medicine" of those who come in contact with rabbit breeders if they have encountered ear canker and if they have made examination for identification of the causative psoropt. To make the examination it is necessary to scrape the skin surface as well as to send the scabs. Secure a small bottle with a tight fitting stopper and put the scrapings in the bottle. Fasten the stopper in the bottle and send by parcel post together with the history of the case.

Symptoms of Ear Scabies

The malady is exclusively localized in the interior of the ear. It commences at the bottom of the ear cavity, or concha, and first manifests itself by itching. The rabbit tosses its head, shakes its ears backward and forward, and scratches at them with its hind feet. It shows evidence of pain when the ears are squeezed.

[1]A Treatise on the Parasites and Parasitic Diseases of the Domesticated Animals, by L. G. Neumann, 1892.

In fifteen to thirty days there is seen at the bottom of the ear cavity a soft, thick, yellowish matter in which the parasites—the Psoroptes communis variety cuniculi—can be seen by means of a strong hand lens, or if this material is examined under a microscope. (The specimens shown in the accompanying illustration are reproduced from a photomicrograph of the parasites from the ear of the aforementioned case.) Later, the yellow, offensive smelling material in which the parasites are found in great numbers is observed. The male is 520 microns to 610 microns long and 310 to 400 microns broad. The ovigerous female measures 670 to 780 microns long and 400 to 480 microns broad.

Life History of the Parasite*

The life history of this parasite is divided into five stages, viz.: the oval, the larval, the pupal, the adult, and the ovigerous female.

The oval stage under favorable conditions lasts from five to ten days. In the larval stage the parasite has six legs and is asexual. In this stage it passes through two or three molts. In the pupa or nymph stage there is added the fourth pair of legs but there are no sexual organs and the males and females are distinguished by the difference in their sizes, the female being the larger. In the fifth stage there are developed distinct sexes—the male and the female. The fifth stage is that of the ovigerous female in which stage, after impregnation, the female molts, which causes changes in the genital apparatus. It is estimated that the ovigerous female lays 15 eggs, of which ten may be females and five males. Under favorable conditions it will pass its life cycle in fifteen days. At this rate, one ovigerous female would cause the production of 1,500,000 scab parasites in 90 days.

If the affected ear be cleared of the morbid matter, the skin lining the cavity is observed to be red, painful when touched, and the skin thickened. It is denuded of its epithelial lining and may be slightly ulcerated, with red, irregular borders which mark the limits between the diseased and healthy parts.

When the disease goes on for two or three months, it has invaded the interior third, and even half of the interior of the ear, which is then occupied by a yellow, offensive smelling, half dried matter in layers, or a more or less dense mass, which contains very numerous parasites. This matter is, in addition, composed of epithelial cells, fat granules, old and recent pus cells, and various foreign bodies that have fallen into the ear.

The parasites are never installed elsewhere than in the ear nor do they cause scabies in the neighborhood of adjacent parts of the ear.

Delafond observed that 45 of 155 rabbits, or 25 per cent of the animals living in contaminated quarters, were affected. He always succeeded in transmitting the disease to healthy rabbits, and so placed the contagiousness beyond doubt. From a fact mentioned by Lucet, it would appear, that certain individuals or families offer a special resistance to the transmission of this acariasis. Efforts to transmit this psoropt to dogs, cats, sheep, and horses were unsuccessful.

Effects of the Disease on the Rabbits

When the disease is chronic, the rabbits become emaciated, although they continue to eat; then the appetite diminishes. The females abort, and do not again come into the period of rut and breed. The limbs of the rabbit may become swollen and slowly emaciation overcomes the animal. A serious diarrhea may also occur.

There is a possibility that the parasites may burrow into the internal ear. The ear muscles may be partially paralyzed, and the ears hang pendulous on each side of the head. There may be symptoms of dizziness, especially when the trouble extends to the brain.

When these parasites are placed on other rabbits or when rabbits are introduced into the infested hutches, from stock not affected, the new comers always contract the disease.

What to Do for the Rabbit

Clean out the hutches and burn the litter. Thoroughly paint all parts of the hutches with a pure disinfectant or with creosote. Give local treatment to the affected rabbit.

With a swab gently rub and remove all the scabs possible and burn them. Then dip the swab in a mixture of vaselin and sulphur and gently swab out the ear. Or the sulphur may be incorporated in light mineral oil.

Things refuse to be mismanaged long * * * *. Though no checks to a new evil appear, the checks exist and will appear * * * *. Nothing arbitrary, nothing artificial can endure.—Emerson.

No individual or enterprise will be truly successful unless the major motive is true service. Those who can render the most beneficial service will be the most highly rewarded in the end.—T. E. M.

* Kaupp, B. F., 4th Revised edition Animal Parasites and Parasitic Diseases.

Vesicular Stomatitis

By A. T. Kinsley

There was an extensive outbreak of vesicular stomatitis in the United States in 1916. The first appearance of the disease at that time was in horses that had been purchased by France and England. There were hundreds of cases in the remount stations at Lathrop, Denver, and other stations where horses and mules were accumulated in large numbers for war purposes. In the latter part of 1916, this disease was reported in cattle. A very virulent type of the disease was noted in a carload of cattle shipped from western Nebraska to the Kansas City stock yards.

This disease has been more or less prevalent in different locations in the United States since 1916. In July and August, 1924, an extensive outbreak in cattle in the Panhandle was reported. Many large herds in Texas, New Mexico, Colorado and Kansas became affected, and there was considerable alarm because of the similarity of this condition to foot-and-mouth disease. This same malady, or one very similar, was reported in September in Central Missouri.

According to all reports, this disease is confined to cattle and horses, although experimentally it may be transmitted to hogs and sheep.

Cause Not Known

The specific cause of vesicular stomatitis has not been identified although much experimental work was done in 1916 and 1917 but it was not possible to positively demonstrate the causative factor. Gregg, McGuire and others isolated a micrococcus from the serum obtained from unruptured vesicles. This organism apparently lost its virulence very rapidly and although the disease was apparently transmitted by inoculations, the findings could not be proved by check experiments. Other investigators have isolated various other microbian agents but no one has yet been able to successfully produce the disease in a series of animals.

The disease is infectious and is transmissible by means of the vesicular fluid and the lesions. The infection is more virulent in the beginning of an outbreak, the virulence apparently subsiding as the disease progresses. From the general trend of the disease it would appear that the virus is short lived. The infection is not readily carried from one farm to another by workers or caretakers, although the disease may be transmitted by infected pails, troughs, harness, etc. It has been reported that the disease was transmissible to the feet and legs of cattle by inoculation.

Symptoms

The first symptoms manifested consist of hyperemic areas on the buccal mucosa, particularly on the tongue. The hyperemic areas are the forerunners of the vesicles which may appear as a reddened elevated area, the color being due to the engorgement of the tissue beneath. The vesicles vary in diameter from the size of a dime to a dollar, and it is not uncommon for the vesicles to coalesce, thus forming a large vesicular mass. The large vesicles usually rupture and the involved area becomes eroded, thus leaving a denuded surface. In horses and mules these lesions are primarily confined to the tongue, although they may be observed on the mucous membrane on the palate and elsewhere in the mouth. The lips may be swollen and sensitive. There is inappetence, salivation, and smacking of the lips. There is no rise of temperature, but the animal shows a haggard appearance and is dull and restless. In horses there is gritting of the teeth and drooping of the head. There is a marked depression in dairy cows and a cessation of milk. In some cases lesions of lesser magnitude and intensity have been found on the teats and udder. The disease runs a relatively short course, in uncomplicated cases recovery taking place in from 7 to 10 days.

Differential Diagnosis

From the foregoing, it is noted that vesicular stomatitis is quite similar to foot-and-mouth disease, as well as mycotic stomatitis and pustular stomatitis. The fact that the disease occurs in and affects horses and mules is sufficient to differentiate vesicular stomatitis from foot-and-mouth disease; however, it may require a week or ten days to prove that a certain infection may or may not develop in horses. The simultaneous occurrence of vesicular stomatitis in cattle and horses on the same farm and the general absence of foot lesions give a fairly good basis for elimination of foot-and-mouth disease. The further fact that hogs may be exposed to animals infected with vesicular stomatitis without development of the disease is further proof of the absence of foot-and-mouth

disease. In the outbreaks thus far observed, the infection in vesicular stomatitis seems to diminish as the outbreak progresses and in foot-and-mouth disease the virulence of the infection becomes intensified with the progress of the disease.

It is not always an easy matter to distinguish vesicular stomatitis from mycotic stomatitis. However, mycotic stomatitis usually involves 20 per cent to 30 per cent of the herd and there are foot lesions in a large percentage of the affected animals. Further, mycotic stomatitis, as a rule, does not affect horses and mules. Hogs are usually free from this malady, although they may be unduly exposed.

Necrotic stomatitis occurs in all groups of animals and should not be difficult to differentiate from mycotic stomatitis or vesicular stomatitis because of the fact that it is the result of infection with the B. necrophorus and produces a lesion that is characterized by necrosis from the beginning of the process. In other words, there is no vesicular formation in necrotic stomatitis. The lesions consist of necrosis and from the necrotic tissue there escapes a pungent, disagreeable odor. These lesions may be found in cattle, sheep, swine, and less frequently in horses.

Pustular stomatitis can usually be distinguished from vesicular stomatitis by the fact that the former is confined to horses and mules and the disease is typified by small pustules in the buccal mucosa.

Treatment

Considerable concern has been occasioned because of the occurrence of one or the other of the aforementioned maladies and the present season has been noted by the widespread occurrence of vesicular stomatitis. This malady is not difficult to treat. Uncomplicated cases usually recover in a week or ten days. About the only treatment required is a mouth wash and general nursing. Affected animals should be isolated, thus diminishing the possibility of spread of infection.

Poisonous Plants

By L. H. Pammel

THE RED-BERRIED ELDER AND PAPAW POISONOUS

Dr. L. A. Kenoyer, a former student of mine, sends me the following items concerning these two plants:

"I notice in your Weed Manual that you do not have any very definite data on poisonous properties of the red-berried elder, Sambucus racemosa. I thought you might be interested in an observation regarding it.

"On a recent trip I found some of the ripe berries and desiring to see how they compared in flavor with Sambucus canadensis, the berries of which I ate as a boy, I ate three of these berries. On reaching home about three hours later, I was seized with a violent headache, accompanied with a loss of appetite and a somewhat laxative action upon the bowels. I felt all right after about three hours.

"I notice, too, that your data are rather scanty for the papaw, Asimina triloba. As a schoolboy I had noticed my fellow-students eating the kernels of the seed, which they had picked up off the playground. I ate a few and became very sick for a time. Nausea and vomiting were the characteristic symptoms, as I remember them."

I am glad to receive the items. I have this note on the papaw in my "Manual of Poisonous Plants":

"While the papaw is edible, there are some cases of poisoning on record. Care should therefore be exercised in its use."

The papaw is distributed from Ontario, New York, to Dubuque, Iowa, common in the southwestern parts of the states and southward in Missouri and eastern Kansas.

It will be noticed that Dr. Kenoyer refers to the fact that the kernels of the seed are injurious. It is a well known fact that several of the related plants contain alkaloids which are said to be more or less injurious.

The red-berried elder is not mentioned in the "Manual of Poisonous Plants" except incidentally. The red-berried elder is distributed throughout the northern states reaching into Iowa, Illinois and Indiana. The fruit is bright red. The statement given by Dr. Kenoyer that the plant is injurious is therefore of considerable interest. The red-berried elder contains a glucoside. I have tasted some of the berries myself. The flavor is anything but agreeable. I do not recall that I had any injurious symptoms. Of cours we did not eat very much of the berries.

MISCELLANEOUS PLANTS

Dr. R. E. Harvey, of Bonesteel, S. Dak., sends a lot of specimens of plants and the following letter:

"I am sending you some specimens of plants that I would like to have you examine and send me the names of each plant according to their numbers. I already know the names (common name) of some of the specimens but would like to learn the scientific name and would like to know the ones that are poisonous if such is the case. I gathered these from a pasture where a farmer had been losing some cattle and would like to learn whether they are poisonous. Please examine these specimens and send the bill for your trouble. I was in your veterinary class of 1917."

The specimens identified are as follows:

1. Wild Rye (Elymus canadensis)
2. Wormwood (Artemisia ludovociana)
3. Woolen wormwood (Artemisia frigida)
4. Blazing star (Liatris punctata)
5. Head plant (Amorpha canescens)
6. Fleabane (Erigeron sp.)
7. Goldenrod (Solidago—s. missouriensis)
8. Horse mint (Monarda mallis)
9. Wormwood (Artemisia caudata)

None of these plants are poisonous. Perhaps the wormwoods, to which sagebrush is related, may contain some injurious principle. They are all well known remedies for worms.

One species of goldenrod has been considered poisonous but the one you sent has not been so considered. I have described the poisonous action of goldenrod as follows in my "Manual of Poisonous Plants:"

"Symptoms: The animal appears dull, ears drooped, temperature elevated, ranging from 103 degrees Fahrenheit, during the entire course of the disease. The visible mucous membranes are pallid. On the mucous membranes of the vulva small petechial spots are seen. Occasionally the legs swell and edematous enlargements appear under the abdomen. The appetite remains fairly good during the entire course of the disease. Emaciation takes place rapidly as the disease advances. Loss of co-ordination with staggering gait. Death takes place in from two weeks to two months from the onset.

"Post mortem: On cutting open the body the blood appears to be completely disintegrated, resembling ordinary blood serum. Intestines bloodless, with numerous petechial spots on the mucous membrane. Spleen enlarged, weighing from six to ten pounds. No structural changes, apparent to the naked eye. The lungs and kidneys apparently normal. The brain and spinal cord were not examined.

"I am fully convinced that this disease is due either to some poisonous principle in the plant or some parasitic fungus upon the surface of the same."

SWEET FLAG AND BLUE FLAG POISONOUS

Dr. Richard Harvey, of Montpelier, Ohio, sends the following communication to me in regard to sweet flag:

"Being a subscriber to Veterinary Medicine, to which you contribute your editorial on 'Live Stock Poisoning,' I beg leave to ask you the following: Is calamus (sweet flag) poisonous to cattle? History: Three cattle were in a wooded pasture and in this pasture there was a small calamus swamp of about one-eighth of an acre. This swamp contained no water and no other vegetation except that mentioned above. These cattle were in the swamp for a few hours, just prior to their death, for they had literally tramped the flags into the soft ground and had grazed upon them and the root to a considerable extent. Two of the three cattle died before the symptoms were observed and the third was severely purged. Ingesta gave an odor of calamus. All organs normal except the mucosa of the intestines, which was highly injected, presenting a condition of severe irritation. It is extremely difficult for me to believe that these cattle died of eating the above mentioned plant, since I am told that for years back old settlers came to this swamp for the roots which they claim have a medicinal value and I myself have eaten small portions of the roots. But these cattle must have had an abnormal appetite for something in this swamp (no water in the swamp) evidenced by the way they tore it up, and from the fact they stayed there and died, I believe, without much struggling."

There are two flags but only one plant commonly known as sweet flag. This is the Acorus calamus which is a member of the Aroid family to which the skunk cabbage, Indian turnip, calla lily belong. Many of these plants have acrid properties, and some are known to be very poisonous. The plant has a flag-like leaf but pale green in color, and with a rather dense "head" which bears the seed. The flowers are inconspicuous, somewhat greenish yellow.

The plant is found in northern United States, especially from Maine to Iowa. I saw acres of it in some of the flats of the Wisconsin River this summer.

The sweet vegetable calomel (Acorus calamus) is used in medicine and contains the bitter principle, acorin, and an alkaloid. The sweet calomel is poisonous, under some conditions, causing disturbed digestion, and in severe cases, gastro-enteritis, persistent constipation, followed by diarrhea and passage of blood in the feces.

It is not improbable that the eating of large amounts of the plant may have caused injury and perhaps death. Another poisonous plant occurs in such marshy places, namely cowbane. The blue flag which grows in similar places may have been confused with the sweet calomel. The flowers of this plant are large and bluish and the leaves are bright green and much wider. The root contains the substance irisin, or iridin. The acrid resinous substance, irisin, acts powerfully upon the gastro-intestinal tract, liver and pancreas, causing a burning sensation and congestion. That the root is poisonous may be seen from the following statement made by Dr. Rusby:

"Another rhizome whose acrid taste is likely to prevent ingestion in poisonous quantity, is that of the common Iris versicolor, L. Still. Because this is commonly known as the blue flag, there is some danger that it might be eaten in mistake for calamus, which is commonly known as sweet-flag. If so, it would prove seriously, if not fatally poisonous, as its well-known emetic-cathartic properties, even when toned by drying and keeping, are powerful, and in a fresh state would be decidedly violent."

Dr. Johnson says: "Iris, in full doses, is an active emeto-cathartic, operating with violence, and producing considerable prostration. Its effect upon the liver appear to be analogous to those of podophyllum. In sick headache dependent upon indigestion, small doses, frequently repeated, often act most happily. It has been largely used by eclectic practitioners, and is highly esteemed by them as a hydragogue cathartic, an alterative, sialagogue, vermifuge, and diuretic."

Items of Interest to the Practitioner

By A. T. Kinsley

The swine production of Germany is still considerably below the average figure. It has also been pointed out that France can not produce sufficient meat to supply the demand. This would indicate an increased export of meat food products.

"Daily exposure to an atmosphere containing as small a quantity as 0.02 milligram of mercury per cubic foot of air, results in signs and symptoms of poisoning. The histories indicate that daily exposure must continue for two to three months, or more, before symptoms appear."

Marvin and Soifer, of Yale University School of Medicine, have conducted a series of experiments to determine the therapeutic value of camphor-in-oil and have reported that they were unable to demonstrate any action of the preparation they used on the circulation in congestive heart failure. This product has been highly recommended in certain types of cases in veterinary practice and several practitioners have reported splendid results. It may be possible that the compound may have a definite favorable action in types of cases that were not investigated by Marvin and Soifer, or is it possible that the cases in which favorable results were apparently obtained, recovered in spite of the treatment?

H. Schmidt, Experiment Station Veterinarian of the Texas A. & M. College, has published a preliminary report on "Loin Disease," or "Down in the Back," a disease peculiar to cattle in the coastal region. Although the malady is similar to an infectious disease, Schmidt has been unable to demonstrate any pathogenic organisms, and it is tentatively assumed that the condition is due to bacterial toxins developed in carcasses and consumed by cattle. A complete description of this disease was published in Veterinary Medicine in the July issue of 1921, in which it was stated that the soil in the region in which the disease occurred was deficient in phosphates and it was suggested that this disease may in some way be associated with dietary deficiency. More recent publications, particularly Sir Arnold Theiler's report of lamzeitke in the Union of South Africa, indicates that deficiency of phosphorus is the primary etiologic factor and that the abnormal appetite and craving for minerals due to the deficiency causes the affected animals to chew and consume bones containing putrid products

and thus become intoxicated. To overcome the deficiency, Schmidt recommends the feeding of sterile sweet bone meal.

A study of the history of medicine reveals many important discoveries that are of value in the diagnosis of disease. The improvement of the microscope, the perfection of artificial culture media, and the discovery of agglutinins, precipitin and related substances in blood serum have simplified the identification of microbian diseases and rendered possible the differentiation of closely related microbian maladies. Chemical pathology, the outgrowth of physiologic chemistry, has revealed many important facts that are of value in diagnosis. Urinalysis is an every day routine in all up-to-date clinical laboratories. Recently the chemical analysis of blood has been found to be of value in certain cases and no doubt chemical pathology will be found applicable in many other ways as an adjuvant in diagnosis. Medicine is truly a progressive science and it is not possible to predict the future possibilities, but it is certain that only the persistent student will be up-to-date five or ten years hence.

A man is judged by the outsider by the style of his writings (apart from personal contact it is not possible to do otherwise); a profession is judged by its press. It therefore behooves those concerned to watch jealously over their journals, and to leave no stone unturned to ensure that they maintain the highest possible standard.—The Veterinary Journal.

Hypertrophy of the suprarenals is caused by deficiency in vitamin B, according to Beznak.

Tonsillectomized children are, according to observations, in a limited area less susceptible to diphtheria than children that have not had their tonsils removed.

The dairy cow is the most economical of farm animals in the conversion of farm crops into human food. The hog is second, and the fowl in the production of eggs, third.

The presence of a corpus luteum prevents ovulation, produces proliferation of the mammary gland and is responsible for the development of the placental membranes.—Loeb.

It is difficult to raise orphan pigs unless they can be kept at a temperature of about 70°F., and provided with a proper diet. Exposure to drafts of cold air is a common predisposing cause of digestive disturbances that may terminate in a fatal attack of scour.

A large percentage of the diseases of the reproductive apparatus which prevent or retard conception in breeding animals, is in the main due to the invasion of the various organs by certain micro-organisms. Of these, Bacterium abortus Bang is by far the most important.

—Boyd.

There have been numerous indications that the suprarenals have some function in metabolism but the exact relationship and specific action of these glands or their products have not been determined.

The American people spent $9.00 per capita in 1923 for butter and $36.00 per capita for cigarettes. It is evident that the producers of cigarettes are better advertisers than the dairymen.

Up to the present, the essential basis of dealing with infectious abortion in cattle is by precautionary measures, the testing of suspected animals, methods of sanitation and isolation, methods of sexual hygiene supplemented by the judicious use of vaccines.—McGilvray.

Frost and Bachmann examined the milk from 412 cows, that were supplying a high grade milk, for hemolytic streptococci. These micro-organisms were demonstrated in the milk of about 28 per cent of the 412 head. These authors concluded that hemolytic streptococci frequently occur in milk but are apparently not harmful to the consumer. On the other hand, an occasional amateur milk inspector condemns quantities of milk because of the presence of streptococci.

Mackenzie, in the Journal Royal Army Medical Corps, London, reported an infection in a man with a micro-organism that conforms in its morphology, cultural characteristics, serological reaction and virulence to the B. suipestifer. This is probably the first case reported in man in which this microbian agent was an apparent causative factor.

Dr. Corper, director of the research laboratories of the National Jewish Hospital for consumptives, Denver, Colo., reports that 3 per cent of carbon dioxid prevents the growth of

the tubercle bacilli and that 15 per cent destroys them. From this finding, the doctor suggests that if some method can be devised for carbonizing the various tissues, tuberculosis can be controlled and probably cured.

Deficiency in vitamins is usually indicated by indigestion, unthriftiness, inappetence, nervousness and probably temporary sterility. Vitamin deficiency has been more frequently reported in poultry and swine than in other animals. Such conditions can be prevented by feeding ample quantities of greens and provision for sunshine. It is claimed that sunshine that passes through glass is not effective.

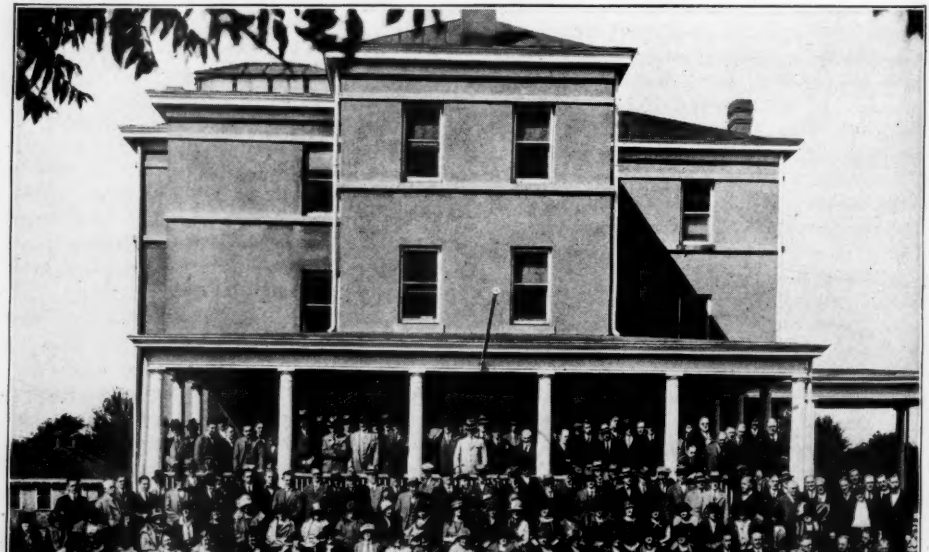
Chicken lice make their home and breed upon the body of the fowl. Mites visit their host at nights and remain on the roosts in the day time. Lice are controlled by treating the infested fowls, and mites are primarily controlled by cleaning and disinfecting the houses and roost.

Some limited investigations have revealed the fact that the bottled beverages are not sterile products. In a series of 25 samples of different beverages selected from a soda fountain the average bacterial content was 100 per mil. Some cities regulate beverage manufacturers but the large percentage of this product is not produced under supervision.

Tail Snapping

Tail snapping is apparently a viscious habit of pigs. This habit or vice develops rather rapidly and although it appears to be purely a habit, there are some factors that may have some influence in the occurrence of the condition. Tail snapping usually occurs in relatively young suckling pigs and as a rule the beginning is a sequence of fighting. In some instances one pig is the principal offender and proceeds with detailing all available pigs, but in most cases the habit is assumed by several pigs about the same time. Tail snapping may be so extensive that every available pig is detailed. This condition is of interest from the viewpoint of habit or vice and is of some economic importance.

If readers of Veterinary Medicine have some definite knowledge as to cause and prevention of tail snapping, it will be of interest to others, and your reports will be gladly received for publication in a future issue.



Joint Meeting of the Hudson Valley Veterinary Medical Association, Hudson County and New York County Veterinary Associations, at the Lederle Antitoxin Laboratories, Pearl River, New York, September 24, 1924.

Prevention and Control of Bovine Infectious Abortion

By John M. Buck, Pathological Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

The acquiring of information that may be of value in the prevention or control of the disease is the ultimate object of all experimental procedures. As we gain a clearer understanding of the different phases of the disease, we should be in a more favorable position to correctly evaluate the reasonableness of different theories and methods of combating.

The impression seems to be somewhat general that our knowledge regarding infectious abortion is rather limited as compared with some of the other diseases to which the domestic animals are subject. This view according to my idea is erroneous, for we are quite familiar with its causative agent, and we know how to propagate it artificially. We have information regarding its morphology, its cultural characteristics, its ability to withstand various conditions, how it is eliminated by diseased animals, how it may gain entrance to the animal body, and in what tissues or organs it multiplies, and numerous other facts concerning it. There are other diseases which we have under better control today where the etiology, at least, is not as well understood. It occurs to me that our ability or lack of ability to control an infectious malady may be less dependent upon a complete understanding of all the facts relating to it, than upon how extensively the causative agent is disseminated by the diseased subject.

What we would like to know is how to prevent the spread of the disease in a herd where occasionally a cow expels a fetus and gallons of fluid, the latter so saturated with the microorganisms that 5 cubic centimeters and probably a smaller amount is capable, if ingested by a susceptible animal, of transmitting the malady. So far as I am aware there is no other infectious condition of live stock where such enormous amounts of infectious material are eliminated, and unless extreme care is exercised may also be widely distributed. This problem is indeed a serious one, but it is the one with which we are often confronted.

It should not be an extremely difficult matter to maintain a Bact. abortus free herd once it is built up or assembled. A knowledge of the facts that are at present available should in most cases make this possible. Different dairy owners who have recognized the importance of excluding the disease have demonstrated that it may be accomplished.

There are reasons for believing that the disease is most commonly introduced into clean herds by the purchase of cows or pregnant heifers that carry the infection in their bodies. A cow with a calf by her side is no guarantee that she is not a disseminator of the infection or will not become a disseminator since it is well known that infection of the placenta of cows does not always result in the death of the fetus.

The serum tests are of considerable value in enabling the purchaser of cows and heifers to distinguish between the infected and non-infected, but they have their limitations in this respect. Our experience with these tests has shown us that pregnant heifers may in some cases remain negative to the tests for as long a period as five months after an exposure to Bact. abortus infection of sufficient intensity to later cause them to abort, and that in some cases reactions may develop only a brief period before the act occurs. This observation enabled us to recognize the difficulties that confront the dairyman in keeping his herd free from the affection while adding cows or pregnant heifers to it from questionable sources. Bulls and unbred heifers are less liable to act as agents of dissemination and may therefore be added with somewhat more safety.

The food supply offers another possible agent for spreading infection. Roughage and grain if produced on farms where infectious abortion exists may become soiled with the discharges of infected animals, and thus transmit the disease to healthy stock to which fed. The affection is probably introduced in some instances as a result of pastures receiving the drainage of other farms where the malady is present and there is a possibility that animals pastured adjacent to railroads may occasionally be subjected to more or less exposure as a result of the scattering of contaminated bedding from stock cars. We are pretty well justified in concluding, however, that it is the infected cow or the infected pregnant heifer that is mainly responsible for the development of new centers

of infection, and that successful efforts in excluding them from non-infected herds would usually mean freedom from the disease.

How to deal with infected herds is a more complicated problem especially in those states which are not equipped with facilities for applying the agglutination test. While tests of entire herds may not always be of material value in the prevention of abortion losses, the results of such tests make it possible to secure a reasonably accurate idea as to the extent of the infection that prevails, to become more definitely informed as to whether abortion losses are due to Bact. abortus infection or other causes, and to decide upon an appropriate method of attack.

When the number of animals which give reactions to the tests is small in proportion to the number which give negative results, efforts to eliminate the infection from the herd by disposal of the reactors and disinfection of the premises should receive consideration. It would be unwise to assume that the original test detected all of the infected animals. Two or three tests at least should be made at intervals of two or three months in order that the disposal of animals developing reactions subsequent to the earlier test or tests may be possible before they abort and act as spreaders of the infection.

It is usually impracticable to utilize this method since owners of infected herds seldom view the situation with alarm until the number of reactors may equal the number of non-reactors.

A less drastic method of dealing with infected herds, providing the facilities exist, that has received attention consists in retaining the animals irrespective of whether they react or otherwise, but handling them as a separate unit, providing different stables, pastures, attendants, etc. Such a plan is seldom practicable excepting in the case of valuable breeding animals and in herds of considerable size. The frequent application of the agglutination test to the non-infected portion of the herd would be necessary for the early detection of carriers of the infection.

Other methods which have been employed with some degree of success include sanitary management and artificial immunization. These methods have been used in combination.

Sanitary management has reference to the handling of animals in a herd in such a manner as to materially reduce the transference of the infection from the diseased to the healthy. It is not extremely popular with the herd owner as a rule, for it requires that he carry most of the burden. Another one of its disadvantages lies in the fact that it is a more or less continuous undertaking. While it fails to insure freedom from abortion losses our observations have indicated that it frequently accomplishes highly beneficial results.

Our ideas as to what constitutes proper sanitary management require revision from time to time, since knowledge regarding the disease is progressive, and such management is based upon available knowledge.

As previously mentioned some of the substances expelled by infected animals which we know carry the infection are the fetus, fetal membranes, uterine fluids for a limited period following abortions, milk for prolonged periods, the seminal fluids of infected bulls and the feces of infected calves. We also know that cows, which to appearances calve normally, may expel placentas and uterine fluids which are heavily saturated with the infection. The knowledge of these facts, associated with the information that animals readily acquire the disease through the digestive tract, enables us to appreciate the importance of isolating aborting animals so long as uterine discharges are present; of providing maternity stalls that may be disinfected frequently, and of so disposing of fetuses, placentas, and bedding used by infected or suspected animals as to render them inaccessible to stock which is free from the disease. The discovery that infected bulls may carry the causative micro-organism in their semen is sufficient reason for the exercising of care in the management of the bull. While transference of the disease may seldom occur during the act of coition, it seems reasonable to conclude that the infected bull may be capable of contaminating his environment, which would then become a menace to susceptible cows and heifers. Bulls giving marked reactions to the agglutination test should not be used for service. Even though danger of spreading the disease thereby might not be marked such reactions are strongly suggestive of infection of their generative organs. The reproductive powers of such animals may be greatly impaired if not destroyed.

One discouraging feature in attempts to prevent the transference of infection from diseased to non-infected stock lies in the fact that cows frequently abort unexpectedly, even though closely observed for the detection of symptoms. Such animals may scatter a considerable amount of virulent infectious material before being isolated.

The Future Policy of the Veterinary Profession*

By L. A. Merillat, President, American Veterinary Medical Association

To endure a profession must do more than obey its doctrine. It must do more than venerate ideals. It must have programs, policies, platforms which are definitely understood by the people. In other words, to meet the popular approval and public support upon which its integrity depends, a calling must secure for itself a sharply defined and well comprehended status.

No Secrets

A profession clearly distinguishes itself from other occupations by its objectives. In the ethical sense the profession is altruistic, the others egoistic. The profession works for the welfare of the masses after qualifying in the practical application of some department of science. Its ideals are lofty, its motives beyond reproach, its codes unselfish, and its exploitations are for the common good. It has no trade secrets among its members, works in the open, and takes the people into its confidence. The profession does not protect itself by secrets, and patents, and trademarks. Its discoveries are public property. Its archives containing records of useful achievements are open to the gaze of the people.

Self-Imposed Obscurity

Having lived up to these requirements through all of the years of medical history, the practice of veterinary medicine is therefore a profession. It has qualified as such. From Hippocrates to Galen; from Galen to Pare; from Pare to Pasteur, Lister and Koch; and from the time of these men until the present, veterinary medicine has been an obedient ward, obeying a strict code of ethics, and ever keeping pace with the progress of medical science. Its fault has been its self-imposed obscurity. Little known, little understood, the practice of veterinary medicine has scarcely been recognized as a profession by the masses. During all of the centuries its orientation has never been fixed; the role it plays has not been comprehended and the masses barely know of its existence. Admitting that the prosperity of the nation leans a great deal upon its veterinary service, it seems singular on first thought that this attitude has not changed until the present moment. On second thought, however, the fault seems to be our own. We seem to have failed to circumscribe our realm.

Millions Interested in Livestock

The situation is a national misfortune. It is the inspiration of this article, for no nation can be permanently successful without a good veterinary service. Here in the United States, for example, where there are countless millions invested in agriculture, chaos in veterinary service would spell disaster. Capital would avoid livestock and even land, types of domestic animals would deteriorate and, as disease became more and more rampant, agriculture would become a more unprofitable, less attractive occupation; the nation itself would sink into a mediocre position. It is worth repeating that through the efficiency of its veterinary service the United States is the safest country on the face of the earth in which to own livestock. Foreign-born scourges have been driven off, indigenous diseases controlled, and every farm where valuable animals are bred has access to skilled veterinary service. It is not a mere eulogy to state that if foot-and-mouth disease, contagious pleuro-pneumonia, rinderpest, tuberculosis, swine cholera, glanders, anthrax, blackleg, and many of the other less formidable animal plagues were not under control, the United States would be a second-rate nation. Indeed few people comprehend to what extent their temporal well-being has depended upon the small coterie of scientific men they know only as "horse doctors."

Glanders Control Furnishes Example

To illustrate: A rural veterinarian drives to a given farm to administer to a horse discharging at the nose, supposedly from a bad cold, diagnoses glanders, kills the animal, tests those exposed with mallein, and quarantines the premises. Few people fully appreciate what this service means. This one animal neglected or treated by the uninstructed would sooner or later have transmitted the disease to other animals on the farm and in turn this district would have contaminated other districts until the horse population of the entire country would have been pested.

Russia's Setback

The point is graphically illustrated in the recent predicament of Russia. When Russia broke down with revolution in 1917 it began to lose millions from starvation. The world

* Fifth Annual University of Illinois Veterinary Conference

does not know that much of this misery was due to glanders among its horses, rinderpest among its cattle, and other scourges which devastated the sheep and swine herds. After the revolutionists had replaced its qualified veterinary personnel with uninstructed laymen selected for political reasons from among the soldiers of the red army, Russia starved and will not recover for a generation, according to expert opinions, because it allowed its source of food supply to be destroyed through the instrumentality of animal diseases. While there were other contributing causes to the miseries of Russia, a Polish veterinary officer sent there to investigate the animal situation attributes most of its troubles to the appointment of a sergeant of the cavalry to the high position of chief veterinarian to replace a scientifically trained man.

Dangerous to Ignore Science

Science was ignored, laymen politicians replaced veterinarians, laboratories were destroyed as useless adjuncts, and veterinary schools were closed. While these facts relate to revolution and unnatural conditions, nevertheless they impose a responsibility upon the veterinarians of this or any other country, and upon all men who control the destiny of veterinary education and veterinary practice.

Veterinary Service an Asset to the Livestock Industry

In Russia the breakdown was rapid. It occurred in a few years. In this country where practice is thought to be declining and veterinary science deteriorating from lack of public support and appreciation, it is reasonable to fear that we may, although more slowly, arrive at the same end. With the chairs in the veterinary schools empty, appropriations for veterinary education will naturally decrease, the incentive for research will decline, and there will be too few qualified men to carry veterinary science into the barn yard. The practice of veterinary medicine, like any other occupation, cannot progress if it is not attractive to eligible young men; that is to say, if it is not a profitable vocation. Governmental positions, federal, state or municipal, which are being created to meet the approaching emergency are less likely to attract young men than the individual ambition to establish a profitable, independent income from field practice. Competition, the determination to succeed, the ambition to render competent service, and the morale maintained by personal success are the impelling forces required to make any occupation progress. Veterinary practice is no exception.

Policies Important

These premises suggest the advisability of the veterinary profession adopting definite policies, the lack of which has allowed it to drift. It seems highly important to the livestock industry of this country that the veterinary profession should survive as such, and that it should not be replaced by something else, something untried, something that may bring veterinary service back to a point of departure we left many decades ago. But we cannot survive nor even elicit nominal support unless we sharply define just what we represent and can succeed in having our definition approved by the highest counsel in animal husbandry and, through animal husbandry, by the people themselves.

How to Promote Veterinary Science

We are acquiring the habit of condemning extension work, farm bureau activities, state medicine, and other intrusions upon our realm. Whether these have done harm, except in isolated incidents, is problematical, but that they will do harm unless they are controlled by sound policies born of high professional ideals within the veterinary profession seems certain. It is not denied that these so-called intrusions may be helpful as well as harmful. The outstanding thought in my mind is not that of curbing them but of promoting them in such a way as to activate private veterinary practice and thus promote veterinary science.—Animal Pathology Exchange, Univ. of Ill.

Feeding has little influence upon the vitamin A content in cows' milk, but it is very probable that the general physical condition of the cow is an important factor. The systematic use of codliver oil usually increases vitamin A in the milk. It would be advisable to feed codliver oil to sows, cows, mares, ewes or bitches in which there has been a tendency to rachitis in the young.

Takahashi and Kawakami are of the opinion that they have isolated vitamin A from codliver oil, butter and egg-yolk. These investigators believe that vitamin A is composed of carbon, hydrogen and oxygen combined in such a way as to form an aldehydic substance. It is unstable in light and oxygen. This product restored the health of a mouse that was at the point of death because of a deficiency of vitamin A. The practical synthetic production of the essential vitamins in sufficient quantities for medicinal purposes is probable in the not far distant future.

Nitroglycerin Poisoning of Cattle

By W. C. Nye, D. V. M., Boise, Idaho

On July 23, 1924, I was directed by Dr. W. R. Smith, State Veterinarian of Idaho, to make an investigation of losses among the range cattle of Owyhee County, Idaho. This investigation was made in co-operation with Dr. J. S. Allen of Nampa, Idaho.

From the little town of Murphy, the last railroad point, we proceeded by "flivver" into the range district about fifty miles and uphill all the way.

The cattle were Herefords and Shorthorns running loose on leased and public range.

We stopped in the immediate vicinity of quite a large mining property located in a narrow canyon, and only a few rods from a small creek used as a watering place by the range stock. All the losses had occurred within half a mile of this mine. Twelve or fifteen head of steers and fat cows were already dead when we arrived and about ten head were affected. The history showed the animals would live four or five days if not disturbed, but if driven rapidly uphill they would drop dead.

After four days the animals would be unable to rise, or if they did manage to stand, by widely spreading the legs, they would fall prone upon being moved.

All muscular co-ordination seemed lost, the legs buckling over at the pasterns, knees and hocks. This muscular weakness and partial paralysis seemed evenly distributed throughout the locomotory structures. A cerebral disturbance seemed apparent by the wild staring and protruding eyes, and shaking of the head from side to side. One animal, a long, yearling steer that was prone, was first given a careful clinical examination. The muzzle was partly covered with a thick, ropy mucus that was whipped to a froth around the nostrils by the rapid breathing. A brownish, crusty discharge was found at the inner canthus of each eye, being due, we think, largely to the excessive lachrymal secretions as no conjunctivitis was observed.

The most outstanding symptom was the heart action, the force of the pulsation giving the left ribs a heaving motion. The rate of pulsation was about 150 per minute, but very uneven. Careful palpation of the lungs failed to reveal any congested or hyperemic areas.

There was no indication of flatulence but the abdomen on the right side was slightly sensitive to pressure. A diarrhea was noticeable that contained a small percentage of bloody mucus, temperature 102.5.

Next we examined a four-year-old Shorthorn cow. She was able to gain her feet but locomotion was somewhat staggering. We were able to get within thirty feet of her and the terrific heart beat was easily discernible at this distance.

We next made a careful survey of the immediate neighborhood for poisonous plants. We found none in any appreciable quantities, finding only an occasional lupine, larkspur or aconite plant.

We were firmly convinced that the question of poisoning by plant alkaloids deserved no further consideration, so we proceeded to autopsy the steer we had previously given the clinical examination.

The first thing noticed was the congestion and dilatation of peripheral blood vessels. The rapid heart action could now be partly accounted for, because of the direct influence the vascular tension bears to the force and frequency of the cardiac pulsations. All lymph glands were normal; pericardial fluid was normal in quantity, and there was no hypertrophy of the heart muscle. Lungs were normal except a small quantity of frothy material in the bronchioles.

The rumen contained about half the normal amount of ingesta, which was quite moist. Reticulum and omasum were apparently normal. The abomasum showed considerable inflammatory areas with occasional necrotic ulcers covered with a pseudo-diphtheritic membrane. The great colon and cecum contained small hemorrhagic areas. The bladder was slightly distended with urine and the inner surface was evenly covered with petechial hemorrhages.

After completing the autopsy we carefully covered the ground adjacent to the mine in search of some foreign substance these animals could have eaten. At the base of a large ore dump we found about half a case of discarded forty per cent dynamite. It was apparent the animals had eaten of this because the waxed containers plainly showed teeth marks and the ground showed where the animals had licked up that portion which had spilled out of the box.

Upon questioning one of the riders we learned that he had actually seen the cattle milling

around this particular spot and had experienced considerable difficulty in driving them away. Some of the cattlemen wondered if it could be possible for the animals to have eaten poison baits placed by trappers to exterminate predatory animals. These baits usually contain strychnin and occasionally potassium cyanid.

We were almost certain that the dynamite was the cause of the trouble and directed that the grounds be carefully cleaned up and the cattle fenced off from this particular locality.

In order to either verify or refute our contention we submitted a sample of the ingesta of the abomasum to the state chemist for analysis. He conclusively proved the presence of nitroglycerin in lethal quantities. No traces of strychnin were found.

Nitroglycerin or glyceryl trinitrate has much the same action upon the heart as ethyl or amyl nitrate, this group being considered the most violent heart stimulants known to medical science. These agents are described as dilating blood vessels, directly stimulating unstriated heart muscle and in toxic doses producing headache, nausea, vomiting, muscular weakness and collapse with cyanosis.

Winslow in his discussion of the action of nitrous ether, amyl nitrate and nitroglycerin says, "Their important action is upon the heart and blood vessels, the blood vessels becoming relaxed and blood tension lowered." He further states as follows: "This action is no doubt peripheral and is due to direct depression of the unstriated muscle of the heart walls. The heart beats more rapidly in consequence of lessened vascular resistance and direct depression of the inhibitory center and because a diminished blood pressure indirectly depresses the vagus center and often stimulates the accelerator."

As a possible efficacious treatment we recommended purgatives of magnesium sulphate and twenty minim doses of tincture of aconite or two ounce doses of chloral hydrate. I do not believe the owners carried out this treatment because of the difficulty in handling these wild range cattle.

HORSE TRANSPORTED BY AIRPLANE

I notice in the September issue that according to the press a horse was recently transported by airplane from Paris to Amsterdam. This item is interesting to me as down here quite a time ago, to be exact, December 21, 1923, a horse was transported by airplane for a distance of about 90 miles.

As usual the Army Air Service was ahead of others. Quite often the Air Service here does things for the Veterinary Service, among others the transportation of a veterinary officer 400 miles to inspect forage for army animals.

Andrew E. Donovan, Lt. Col., V. C.
Corozal, Canal Zone

SCHISTOCORMUS REFLEXUS DELIVERED BY CESAREAN OPERATION

One evening in the latter part of August, a farmer called, saying that one of his best cows had ruptured herself in attempting to deliver a calf and that a large mass of bowels was presented. As she was a good milch cow, he was very anxious to try to save her and asked if there would be any hope for the animal if the bowels were replaced. He was informed that an examination would be necessary to determine the possibility of her recovery.

On arriving at the farm, I found a large mass of intestines hanging from the vulva of the cow, but it was easy to see that they were the intestines of the fetus and not those of the cow on account of their small diameter. Further examination disclosed that the fetus was a very distorted mass of flesh and bone and the bulk of the mass was what should have been the fetal body. Palpation did not give much relief to our predicament, as only the fetal head could be palpated at arm's length, the feet being extended far forward in one uterine cornu, while the intestines were partly within the vagina and partly hanging from the vulva. On first examination it was thought possible to dissect the mass and deliver a portion at a time, but after about two hours' hard work that thought was abandoned as a hopeless procedure and the owner informed that delivery was impossible and that we would have to resort to a cesarean section if the cow was to be saved.

This operation had been attempted several times previously, under a general anesthetic, and the results were always unfavorable, so that local anesthesia was resorted to this time. Five grains of morphin sulphate were given subcutaneously at once and the owner instructed to prepare plenty of hot water for the operation. While the wife was heating water and cleansing and sterilizing several pans, the field of operation was washed and shaved and the circumference injected cutaneously, subcutaneously and intramuscularly with a two per cent solution of cocain, using about twelve grains in all. Two well cleaned lanterns furnished the light and the patient was ready for the operation. As an extra precaution the feet

were tied both forward and backward, but the anesthesia was so complete that the animal scarcely moved a limb during the entire operation.

An incision, about sixteen inches long, was made midway between the ribs and hip, and

from two inches below the transverse processes of the lumbar vertebrae, downward through skin, fascia and muscles with one bold sweep of the knife. The peritoneum was then picked up and incised the full length of the cutaneous incision, the rumen pushed forward and the gravid uterus brought into the opening. A point well near the anterior extremity of the gravid cornu was selected as the most favorable for the incision for reasons which will be explained later. The edges of the wound were grasped with forceps and lifted upward to prevent the uterine fluids from escaping into the abdominal cavity, the legs of the fetus grasped and lifted out and the whole mass was removed without any difficulty. The uterine walls were then sutured with No. 4 chromic catgut, continuous sutures, care being taken to bring serous surfaces into contact, as this favors a more rapid union than when the muscles only are brought into apposition. The peritoneum was sutured with continuous catgut sutures, while the abdominal muscles were brought together with interrupted sutures. Linen sutures were used for the skin, placing them about three-fourths of an inch apart and leaving a small opening at the bottom for drainage. The incision was then covered with collodion. Strychnin sulphate was given hypodermically in one-fourth grain doses every three hours for six doses to overcome the effect of the heavy dose of morphin. Results were very satisfactory.

The argument may be advanced that it is easier to operate from the right flank than from the left, but it has been my experience that it is much easier to push the rumen out of the way than a number of loops of intestine. Then, too, if the sutures should not hold as long as is necessary to allow union of the muscles, there is not as apt to be a large hernia following, as the walls of the rumen are more rigid than are the loops of the intestine. The incision into the cornu is made at the anterior extremity so that fluids do not escape as readily into the abdominal cavity. As soon as involution of the uterus and cornua occurs there is, of course, a great

decrease in size, bringing the sutures closer together and the broad ligaments also contract, bringing the organ to a higher level in the abdominal cavity. If the incision is made in the anterior end this will naturally be the highest point and fluids will constantly drain away from

the incision, thereby preventing the accumulation of secretions at the location of the incision and favoring more rapid union.

Another objection sometimes raised to the operation as I performed it is that the abdominal muscles should not be incised but torn apart to favor more rapid union and lessen the possibility of a hernia. I believe that incision is the most satisfactory, since when the muscular fibers are pulled apart the duration of the operation is greatly prolonged and may mean the death of the animal.

This report is written about a month since the operation and the animal is almost recovered and giving her usual flow of milk. The accompanying pictures show the location of the wound and the distorted fetal mass.

W. P. Bossenberger

Williams, Iowa

HEMOPHILIA IN MILK COWS

I will answer through Veterinary Medicine the many letters of inquiry I have received regarding the article on hemophilia in cows which appeared in the September issue. I should have been glad to reply to each letter individually but for lack of time.

In uncomplicated cases of hemophilia, where there is extravasation of blood into the udder, the blood becomes thoroughly mixed with the milk before and at the time of milking, until the entire amount of milk from the quarters involved is colored more or less red with blood. The amount of blood in the milk controls the color. The blood will not clot, neither will the milk coagulate or become stringy, and in all cases the udder, and especially the quarter involved, will become smaller in size and less functional.

In complicated cases, a true case of hemophilia may exist and be complicated by a so-called garget or catarrh of the udder. In such cases, the milk besides being colored pink with blood, if catarrh exists, will also be somewhat stringy and glistening—mucus-like. If the milk is coagulated, the chances are the coagulation is caused by some of the streptococcic group, as stringy or coagulated milk is not found in uncomplicated hemophilia. Cases of red milk where the blood clots or has a tendency to clot, are probably due to injury.

The treatment for such cases should be along the same lines used for uncomplicated cases of hemophilia plus treatment for stringy and coagulated milk. Where blood clots are found in the milk, one should examine the udder carefully for bruises. In some cases the injury is hard to locate. Especially is this true if the udder has been gored by the horn of another animal or by a paling or post. The latter cases should be treated accordingly and not for hemophilia.

I believe this answers the inquiries. If not, I shall be glad to try again.

S. L. Stewart

Olathe, Kansas

RABIES IN COW AND CALF

I was called to attend an eleven-months old calf and a young cow at an interval of a week. Both the animals showed nearly the same symptoms. There was dullness; cessation of appetite and rumination; foamy saliva dribbling from the mouth; countenance horrified. Later on the temperature became subnormal, 99° F.; mucous membranes pale. The animals, which had hitherto been docile, began to attack other animals and men who approached. They tried to suck and graze but could not, due to paralysis of the lower jaws; became emaciated; gait unsteady; fell down on the fifth and sixth day respectively, struggled and died. Inquiry revealed no history of being bitten by a mad dog. The first animal affected was suspected of having foot-and-mouth disease, but there were no lesions on the digits or in the mouth, and on the development of later symptoms, the case was pronounced one of rabies. The cow was also declared to be rabid. I should like to know how far I was right.—R. C., India.

Reply: From the symptoms described, we should be inclined to pronounce these cases rabies. However, you fail to mention one or two symptoms that are fairly constant in rabies in the bovine subject; usually the most noticeable of all the symptoms; namely, a frequent, in some cases almost constant, bellowing, often in an unnatural tone, and second, the excitement and fury practically always engendered by bringing a dog or cat into the presence of the affected animal. Had these symptoms been included in the description, one could have little doubt as to the diagnosis.

Less often with cattle perhaps than with any other animal, is there a history of dog bite preceding an attack of rabies. This is due perhaps to the slight wound left by dog bites because of the tough hide of cattle, and to the further fact that cattle so much of the time are not under observation by their owners or anyone else, making it easy for a stray dog to bite them at pasture and proceed on his way without any person knowing it.

A CASE FOR DIAGNOSIS

I am writing in regard to a case I was called to treat in the hope I may get some light on the condition found. The subject was a black gelding, about ten years old, weight about 1400 pounds. This animal had been working in the hayfield and with the other horses was tied out during the night. One day he seemed very weak and rather unsteady in his walk. The breathing became accelerated and he began to roar badly. The animal had been a roarer for years while at heavy work but ceased immediately he quit pulling. The appetite was practically gone and he took very little water.

The following day I was called to see him and could hear the roar long before I reached the barn. His sides were heaving and the anus moving in and out for a distance of at least three inches. In fact, the animal looked to be about suffocated. The pulse was running at 85 and temperature 104° F. The other condition which baffled me was an emphysematous condition of the skin, at this time extending from the masseter muscles back over the neck and some on either side of the chest. By the time I left, this condition had extended up to the backbone on one side, and in three days the whole body was puffed up, excepting the legs from the knee and hock down. The animal looked more like an elephant than a horse. There was a slight discharge from the nostrils and an occasional weak cough.

Auscultation and percussion of the lungs were of no value on account of the noise from the roaring and the crackling sounds due to the gas under the skin. However, I made a diagnosis of pneumonia and explained to the owner that I had never before seen the other condition, that is, the gas under the skin.

I had this animal moved to an open door and prescribed stimulants. In a short time the breathing became easier, and on the following day the pulse was down to 58 and the temperature 102° F. Also the animal was eating a little. But the gas condition was much worse. I saw this patient two or three times during the ten days it was sick, but it finally quit eating and seemed to die of exhaustion. On one occasion, I tapped the skin in several places and let the gas escape to a certain extent, but it did no good, and on the tenth day the animal died.

I made a postmortem examination and found the lungs in a very bad condition. About one-third of them was like liver and the air passages filled with an accumulation of the consistency of soft cheese. The remainder was very fair but badly inflamed. There was a slight trace of pleurisy. The other organs seemed normal, but all the space around the kidneys, etc., was a mass of gas, just like large bundles of foam, which could be cut away and let fly in the air.

I am at a loss to know what this gassy condition was. There were no perforations in the pleura or diaphragm anyway, as the owner stated the first gas noticed was in the region of the throat. Any light readers can give on this case will be appreciated.

H. R. McEwen, V. S., B. V. S.
Stonewall, Manitoba

TREATMENT OF OPEN JOINT

It is not my intention to bring anything new before the profession, but having had rather good success with the treatment of open joint of late, I thought I would give my mode of treatment and suggest to those who come across a case to try it, as I feel quite confident they will be greatly surprised at the good results obtained.

In reading an article in the June, 1923, issue of Veterinary Medicine on "puff ball powder," a remarkable styptic, I noted it stated that Lycoperdon giganteum will make a cone-shaped plug in the mouth of blood vessels that is so adherent that it holds against the pulsations behind. Taking this into consideration, I did not see, if it had such an adherent action on a severed artery, why it would not, when applied to an open synovial bursa, have the power of stopping the discharge of synovia. So I decided to try it on the first case I came across.

Case No. 1. Bay gelding, 12 years old; kicked on the near stifle; greatly swollen and a discharge of synovia. I applied Lycoperdon giganteum and left some with the attendant with instructions to apply more that evening. The next day I saw the case and the discharge was very slight. I again applied more of the powder. The following day the discharge had stopped, and the animal could put its weight on the leg.

Case No. 2. Bay mare, 10 years old; kicked on the near tarsus; slight discharge of synovia. Lycoperdon giganteum applied, and after three days the discharge stopped.

Case No. 3. Black mare, 5 years old. This mare ran away and kicked at the carriage badly with the result that both hind limbs were cut. When I was called, the off hind fetlock was discharging synovia. Lycoperdon giganteum was applied each day for four days, with the same result as in the previous cases.

In each case in addition to Lycoperdon giganteum, I gave the animals internal antiseptic treatment and kept them perfectly quiet, as I find any movement delays the recovery.

J. Fergus Donnelly, V. S.

Campbellton, N. B.

THE VALUE OF ICHTHYOL IN SKIN DISEASES

On October 3, 1923, a riding mule from a pack train was admitted to the veterinary hospital of Fort Clark, Texas, with a skin infection that looked very much like a generalized case of tinia tonsurans and was diagnosed as such. The infection was located along the neck, back, withers, and costal regions when the case was first admitted to the hospital, but within a few days there was not a spot on the animal's body as large as a dime that was not involved.

The first symptoms of the disease were the refusal of the hair to lie smooth over numerous round areas, a serous exudate, and a very pronounced itching; and later, a loss of hair from the circular areas. When the animal was clipped these areas showed up very prominently.

As the disease progressed, the circular areas were not so well defined and the case then looked more like mange. A skin scraping sent to the Corps Area laboratory, however, was reported as negative, so the original diagnosis was not changed.

The pack train to which the animal belonged had been on a hike and it was ascertained that on frequent occasions public stock yards had been used to corral the animals while in camp enroute. It is believed that this was the source of infection since the disease was contracted during this hike.

The first treatment consisted in clipping the animal and applying the mange treatment as prescribed in Army Regulations. The mixture was applied as hot as the animal could stand and was rubbed in thoroughly with a scrubbing brush. The application was repeated at ten-day intervals. During this time the infection spread to all parts of the body and the part already involved became worse. This treatment was discarded after a two months' trial.

Next, scrubbing the animal with a 5 per cent lysol solution every few days was tried, but no beneficial results were obtained, so this treatment was discontinued after about a month's trial. A mixture of oil of tar, crude oil and cottonseed oil, was tried with similar results.

The case was so puzzling that we decided to try different treatments on different parts of the body as an experiment. Zinc oxid ointment was applied to the head and one side of the neck; sulphur ointment to the costal region of one side; and iodin ointment to the croup and thigh of one side, the entire other side being left without treatment as a check on the results obtained from the various agents used. For a few days it looked as though all three of the applications were proving beneficial, but it was not long until the parts treated were in the same condition as those left without medication.

The next line of treatment consisted in shaving the hair from about three or four square feet of surface and applying tincture of iodin daily, at the same time giving internally one-half ounce of potassium iodid three times daily. For a few days the shaved area seemed considerably improved, but as we had to stop the application after a few days, due to blistering, no permanent results were obtained.

After trying the above various and sundry modes of treatment over a period of 195 days and being just about to give up in disgust and recommend destruction of the animal, we discovered a pound of ichthyol in the drug room and decided to use it as a last resort. The ichthyol was mixed with three parts of glycerin and this solution was thoroughly rubbed in all over the animal's body with a scrubbing brush. The animal was closely watched in order to note any ill effects from absorption. However, there were no ill effects but beneficial results were plainly in evidence. Within 24 hours the improvement was so noticeable that an emergency requisition was sent to the Medical Supply Officer for two pounds of ichthyol and treatments were given at three-day intervals. Improvement continued from day to day, and ten days after the first treatment with ichthyol, the animal was returned for duty. This mule has been observed at frequent intervals since being discharged from the hospital, but there has been no recurrence of the disease.

It is admitted that 205 days is an excessively long time to have an animal on sick report and that his feed and medical attendance during that time would pay for a new mule, but it is to be remembered that we are always expecting good results at some time in the near future. If ichthyol will produce the same results in all cases of mange or tinia tonsurans, this problem will be considerably simplified. Three applications of a 25 per cent solution of ichthyol in glycerin producing a cure in ten days on such an obstinate case, makes one very enthusiastic about this treatment.—Edwin K. Rogers, 1st Lieut., V. C., Army Veterinary Bulletin.

EPITHELIOMA OF NICTITANS MEMBRANE IN MARE

I should like some advice regarding epithelioma of the nictitans membrane in an eight-year-old mare. The entire surface of the conjunctival membrane is involved. The tumor almost covers the eye and under-surface of the lids. Very fetid discharge and much pain. I have had no success in attempted excision in two similar cases recently and should appreciate any information regarding medicinal treatment.—H. H.

Reply: The prognosis in this case is unfavorable. Perhaps the best chance for recovery lies in careful excision and a light application of zinc chlorid, 1 part; starch, 3 parts; and water sufficient to make a thick, tenacious paste. Some years ago oil of Thuja enjoyed a considerable reputation for the treatment of such conditions. It was applied as an ointment and injected into the tumor with a hypodermic syringe.

MELANOTIC TUMOR IN A HORSE

I have a horse in my practice that has a large melanotic tumor on the tail. Would it be advisable to dock the horse, or is there a better way to treat these tumors?—L. W. M.

Reply: As you doubtless know, the treatment of melanotic tumors is unsatisfactory, both for the reason that they usually continue to appear in various parts of the body, and the fact that they frequently take on a malignant form when operated on. No treatment other than docking is likely to be successful in the case mentioned. However, a tumor in this location is under control even though it be malignant and if it is thought best to dissect it out, one can always perform the docking later if the first operation is not successful.

TREATMENT FOR TAPEWORMS IN SHEEP

I should like to know how to make the copper sulphate and tobacco solution for tapeworms in sheep. It is Dr. Hall's treatment for this condition. What quantity of tobacco should be used in the mixture? I have been using a one per cent solution of copper sulphate for stomach worms.—H. L.

Reply: Copper sulphate, one per cent solution in water, and one per cent by weight of snuff or powdered tobacco. The tobacco is steeped in the water overnight and the copper sulphate then added. For sheep, 100 c.c. (3.5 fluid ounces); for lambs, 50 c.c. (1.75 fluid ounces).

FRACTURE OF VERTEBRAL COLUMN IN SOW

The accompanying cut is from a photograph of a three-year-old sow that had a fracture in the lumbar portion of the vertebral column. This sow was a patient of Dr. R. S. Walden of Lennox, S. D. The doctor devised a cart as illustrated to support the abdomen and thus diminish the tension on the vertebral column.

The cart was maintained in position by a light harness. The fracture was apparently completely corrected in three months and the cart removed. Although there was a noticeable rigidity of the vertebral column, the sow was otherwise apparently normal and was bred and produced eleven living pigs. However, nearly all of the pigs died within a few days after farrowing.

A. T. Kinsley

DEFICIENCY DISEASE IN SWINE SUSPECTED

On July 7th, a herd of swine was investigated because the owner had noted that some of the shotes showed marked disturbance of locomotion. The temperature of the affected swine ranged from 104 to 105.5° F. They were being fed on corn and their appetite was normal. This lot of swine was in good condition and the uncertain wabbling gait was the only evident symptom.

Several of those that showed disturbance of locomotion were destroyed and autopsied, and the only constant lesions found consisted of a few definitely circumscribed petechial hemorrhages in one or both kidneys of each shote.

A positive diagnosis was not made but the remainder of the herd was given anti-hog cholera serum and virus and an oats ration was substituted for the corn.

Approximately three weeks after the swine

had been vaccinated there were seven or eight that showed marked inco-ordination and some of them were dragging their hindquarters apparently having no use of the hindlegs. These affected swine had eaten heartily and were growing and a mineral deficiency was suspected. They were provided with a proprietary cod liver oil mineral preparation, lime and charcoal and given a small ration of tankage daily in addition to their ration of oats.

Two weeks later one of the affected pigs died and on autopsy several ascarids and thorn-headed worms were found but no other lesions were noted.

Suggestions on diagnosis and treatment will be appreciated.—K. I.

Reply by A. T. Kinsley: Your inquiry received. From your description and results obtained from vaccination, it is evident that the swine were primarily affected with hog cholera. The wabbling gait, indicative of weakness, occurs in different diseases such as cholera, hemorrhagic septicemia, erysipelas and necrotic enteritis, but inco-ordination and paralysis are usually manifestations of dietary deficiency, perineuritis or pressure.

According to your letter these hogs have been provided with a mixture of minerals and cod liver oil for a period of two weeks. Rachitic swine usually show improvement within ten days or two weeks when provided with ample quantities of cod liver oil and mineral supplements. It would appear advisable to continue the feeding of cod liver oil and minerals and if there is no improvement by that time it is probable that the condition is not of dietary origin.

Tuberculosis of the vertebra in the lumbar region may produce paralysis but it is exceptional to find this particular form of tuberculosis affecting several swine at one time on the same premise. Perineuritis is a degenerative inflammatory process involving the nerves and resulting in paralysis. Unfortunately, there has been no treatment of value found that will alleviate this condition.

Veterinary Medicine will be pleased to have you report on this herd after two weeks' further feeding on the cod liver oil, mineral preparations.

WASHING HORSES

The practice of washing horses, although not injurious in warm weather, should be discouraged. It is a lazy man's way of grooming, and while it removes dirt and sweat, the benefit derived from the action of the brush on the skin and coat is lost. Cleaning horses' legs by washing should not be permitted, as scratches and grease heel will result.

C. E. Jewel,
Lieut. Col., V. C. (Retired).

THE MAINTENANCE RATION OF DOGS

The constitution of a healthy dog's normal maintenance ration has received much consideration from veterinary surgeons. It might be thought that the natural diet of the wild dog—flesh, blood, fat, and bones—would also be suitable for dogs kept in partial confinement under domestic conditions. Such a diet, however, is not economical, and experience has shown that it is not necessary. It has also been found that an exclusive diet of flesh does not give as good results as a mixed diet containing a proportion of carbohydrate for dogs doing hard and prolonged work, such as hounds and sheep-dogs, notwithstanding the fact that the dog is naturally a carnivorous feeder. Pariah or scavenger dogs of the East are, as is well known, omnivorous feeders of necessity if not by choice.

A good test of the efficiency of a maintenance ration for dogs kept in more than usual confinement can be made with the diet allowed to dogs kept in quarantine for a six months' period. Many dogs representing most breeds have passed through the quarantine kennels of the Royal (Dick) Veterinary College. The amount of exercise is limited to bi-daily freedom of half an hour or so in an open court. With the exception of one dog, a West Highland terrier, which arrived with an eczematous condition of its skin, all the animals have completed the six months' period in excellent health and without becoming fat. The daily ration of these dogs consists of dog biscuits and horse-flesh. The dog biscuits are made from bakers' "seconds," mutton greaves ("cracklings"), and boiled horse-flesh, to which is added a percentage of salt. The horse-flesh is obtained from healthy horses that have been shot and bled. The ration is divided into two parts; in the morning a dog biscuit is given dry and at 4 p. m. a larger feed is given consisting of broken biscuits soaked in hot water and mixed with part-boiled horse-flesh. The heavy feed is given in the evening in order to keep the dogs quiet during the night. From our experience we conclude that it is better to feed dogs twice during the day instead of once according to the popular idea.

The allowance for an Airedale or collie, weighing approximately 27 kilos, was weighed

and analyzed. The dog biscuit weighed 380 g., and the fresh unboiled horse-flesh 170 g.

—R. G. Linton, M. R. C. V. S., in The Lancet

ALOPECIA IN A DOG

A valuable Airedale, nine months old, had a broken pelvis and made a nice recovery but is losing hair all over the body. The skin seems clean and shows no signs of mange. The dog is kept tied most of the time and fed on table scraps. I should like to have some suggestion as to treatment of this case.—C. C.

Reply: The condition described is known as general alopecia. The cause is not known, but it is supposed to be an affection of the central spinal nervous system since the loss of hair is symmetrical on both sides of the animal. It is more often than otherwise seen during convalescence after serious illness, in which case it is quite likely to respond to treatment or to recover spontaneously. Where it occurs without any observable cause, it is quite prone to be permanent.

Numerous hair tonics have been recommended for this condition. Their efficacy possibly lies with the rubbing with which they are applied. This rubbing is best done with a strong brush and increases the circulation and improves the nutrition of the skin. A proper diet, plenty of exercise and lots of patience are essential to the treatment. As for the application, there is not much choice, and it is probably not very important. Benzoin and alcohol, 1 to 30, balsam of Peru and alcohol, 1 to 10, salicylic acid and alcohol, 1 to 10, bay rum or pretty much any of the much advertised hair tonics may be used.

CANINE DISTEMPER

I sent a fine Fox Terrier bitch to distant kennels, full of distemper. She was exposed for a few hours, then moved a short distance and bred July 1, 3 and 5, to a dog not suffering from the disease. The dam of this bitch was bred at these kennels, a 14-year-old bitch, to the same dog, but she was kept at the kennels several months and lost her litter a few days before due. Is there a vaccine or serum to prevent her taking the disease and losing her litter?—E. H. B.

Reply by Dr. C. A. Zell: You state that the Fox Terrier bitch was exposed while kept in an infected kennel. You do not give the age of the bitch, but we assume she was of an age when dogs generally do not contract the disease any more. The bitch will not very likely contract the disease herself, since most of the dogs at a certain age are immune to distemper, save a few exceptions to the rule. Furthermore, it seems very improbable for the bitch to act as a carrier of disease if she is now in the best of health and the coming of the litter far away. There is only one chance in a hundred that you will have trouble with this litter, especially if you use careful sanitation in your kennels. Should you desire to immunize the bitch against any possible chance of distemper infection, use one of the reliable distemper vaccines or serums on the market, which are always indicated as preventive agents.

ENLARGEMENT OF MEMBRANA NICTITANS IN DOG

I should like advice on the following case: Boston Bull, about one year old. The dog was apparently all right at night, but in the morning an enlargement about the size of a peanut kernel or a trifle larger bulged from the inner corner of the left eye. After careful examination, I am quite sure the membrana nictitans is injured or a tumor exists. The enlargement disappears at times and then returns. At times it appears more vascular than at others. The right eye is not affected at all. How would it do to lance it to make sure if it is a tumor or irritation by a foreign body? Or should I remove the tumor entirely without lancing? This is a valuable pup, and I want to make sure before operating. Is there much danger of injuring the tear duct, and is the operation accompanied by much hemorrhage? Brumley's book advises quick removal of all this sort of tumors. I have used astringents without apparent results. The condition has existed about four months with no change.

—A. J.

Reply: This condition is a very common one in dogs and particularly in Boston Terriers. Ordinarily excision of the membrane or gland is the only satisfactory treatment. The operation is very simple. Cocain the eye freely (5 per cent solution) and after waiting for a sufficient time for anesthesia to occur, pick the tumor-like object up with a tenaculum or forceps and snip it off with shears. It is only necessary to be careful not to cut the lids or adjacent parts. The hemorrhage may be considerable, and to remedy this, a few drops of adrenalin solution may be put into the conjunctiva just before the operation. By injecting a drop or two of adrenalin with a hypodermic needle at the base of the tumor, one can make the operation practically bloodless. Astringent applications are not successful in this

condition in more than one per cent of the cases, and the operation is so very simple, it is the only thing to be thought of.

CHLORIN GAS TREATMENT OF CANINE DISTEMPER

We are safe in stating that 66 to 75 per cent of dogs have distemper at some time, and the number of dogs that die from the disease may be reckoned as anywhere from 32 to 70 per cent. Since chlorin gas had been found beneficial in treating respiratory ailments in man, it was decided to try it on small animals, especially on dogs suffering from the respiratory form of distemper.

An air-tight chamber was fitted up and the necessary gas-administering apparatus constructed. Since then many canine and feline patients, suffering from distemper and acute respiratory conditions, have been treated. The animals are kept in the chamber for an hour at a time, and four such treatments, in most cases, are sufficient to effect a cure. An electric fan, installed in the chamber, insures the proper circulation of the gas. Five patients are conveniently accommodated at one time.

Laboratory experiments were made to determine the means and the efficacy of the treatment. It was found when cultures, taken from the nasal cavities of two dogs infected with typical cases of distemper, were plated on artificial media and then exposed in the gas chamber, that results were as follows: Plates A and B exposed for one hour at a concentration ordinarily used in human medicine and considered efficacious in the treatment of respiratory conditions such as colds, rhinitis, coryza and whooping cough, were not noticeably affected.

The concentration of the gas was then increased 50 per cent and it was found that, after proper exposure, plate A was entirely free of organisms and plate B contained a very sparse growth.

In the third test, the strength of the gas was increased until a concentration double that used in the first test was obtained and the results were practically the same as in the second test—viz., plate A was entirely free of growth and plate B contained a very sparse growth.

In checking the plates exposed in the gas chamber with those known as "controls," which had not been exposed but which had been incubated for 24 hours, it was observed that the latter plates all contained elaborate growths from both clinical cases.

It was noted, however, and I wish to emphasize this point—that of the two cases tested, case B, which did not respond entirely to the treatment, was a case of longer duration and was much more pronounced than case A, which showed a complete cure.

At the time the tests were being made with the plated cultures, two dogs were used as live controls. That is, they were placed in the chamber to discover whether the concentration of the gas which was necessary to kill the growth upon the plates would in any way prove injurious to live animals. This precaution was necessary, because the moisture in the throat of an animal renders the gas much more effective than in the case of the plates, where little or no moisture is present.

In the original test, a concentration of .0025 mg. per liter was used, which was increased in subsequent tests to one-half again as much, and even to double the original amount, with no ill effects on live controls in the chamber.

These experiments show that to obtain the best results with dogs, the concentration of the gas should be at least six times as great as has been found necessary in the treatment of human subjects.

It is planned to determine the exact efficacy of the treatment by another series of experiments, by selecting animals known to have been exposed to distemper, and to test cultures taken from each. The animals will then be exposed to the gas for given periods and further cultures obtained to determine the efficacy of the gas on the mucous membrane. This test will also bring out definitely the number of exposures required effectually to remedy the condition.

It must be remembered that even though 99 per cent of the organisms were killed by the exposure, the remaining one per cent would immediately begin propagating and cause a recurrence of the original condition. Thus it will be seen that the treatment, to be truly effective, must have an efficiency of 100 per cent.

The efficiency of the treatment for dogs and cats has been sufficiently demonstrated, but it is productive of results only in the early stages of respiratory forms of distemper, and is unavailing in cases of the intestinal or chronic form.

If an animal has been exposed to distemper and has not exhibited symptoms, chlorin gas is, in my opinion, the most effective prophylactic we have—far superior to anything, not excluding vaccines.

H. A. Locke

Washington, D. C.

DISINFECTANT FOR DRINKING WATER OF POULTRY

I should like to be enlightened regarding a paragraph on page 427 of the July issue, wherein the composition of a disinfectant for drinking water of fowls is given as 6 grams of biniodid of mercury and 8 grams of potassium permanganate, dissolved in one gallon of water. I have tried in vain to dissolve biniodid of mercury in a solution of potassium permanganate.

—J. V. C., Haiti.

Reply: It would appear that the statement to which you refer is a mistake, as obviously a stable solution could not be made of these ingredients.

Investigation has shown that copper sulphate and mercuric chlorid are the intestinal disinfectants of choice for poultry. These ingredients are used separately. The work of Dr. B. F. Kaupp, of the North Carolina Experiment Station at Raleigh, indicates that corrosive sublimate is the best disinfectant to put in the drinking water for chickens. In addition to it, Dr. Kaupp recommends the use of sulphocarbolates, and a tablet containing a mixture of mercuric chlorid and sulphocarbolates of sodium, zinc and copper in the proper proportions may be had on the market. However, the common disinfectant used in the drinking water for poultry is simply a solution of copper sulphate.

COLDS AND ROUP IN POULTRY

"Colds" are manifested by a discharge from one or both nostrils. When this discharge collects in the nasal passages, it is rapidly transformed into a cheesy mass which causes a marked swelling of the face just beneath the eyes. This stage of the disease is called "roup." It can be easily seen that "roup" is merely the result of a cold. If fowls did not get "colds," they would not have roup. As a rule, "colds" and roup are confined entirely to the nasal passages, although in many cases the eyelids may become closed by the large swellings beneath them. Seldom, however, are the eyes affected in any other way. This disease is usually the result of housing or weather conditions and not due to any specific infection. Therefore, it is not liable to spread through a flock by contact with diseased birds, nor is it liable to seriously affect any flock that is properly housed and cared for. Improper housing conditions are probably the most common cause of colds. Common faults in housing conditions are presence of cracks in the walls back of the roosts, poor ventilation, overcrowding, dampness, and insanitation. Extended periods of damp, cold weather, or periods during which there is a wide variation in temperature during the day and night, are apt to cause "colds" to become prevalent.—J. R. Beach.

METHODS NOW DEVISED FOR DETECTING RENEWED EGGS

A new deception practiced on the consumers of eggs is now attracting considerable interest from the United States department of agriculture which, by the authority of the food and drugs act, insists that the product of the hen when sold fresh must be fresh and not merely look the part if it is to enter into interstate commerce. Large quantities of eggs are now preserved by first dipping in hot oil to seal the pores in the shells and are then immediately placed in cold storage. There is no objection to the practice, but recently it has been found that a number of egg concerns have been treating these eggs on removal from storage so as to give them the appearance of having been laid lately.

The treatment to remove the telltale oil gloss consists in "manicuring" the shells with a blast of fine sand or in treating them with a bath in an alkali solution, after which they are dried and rubbed with French chalk or talc.

Chemists of the department have devised a method for detecting eggs which have been treated with oil and then subjected to the restoration process.

VETERINARY FEES

A few months ago, I read a price list in "Veterinary Medicine" for testing cattle and thought it was fair—about what I have been charging. The practitioners here in Vermont helped to get the owners to sign up so the herds might become accredited, living in hopes that we might receive our reward later on by getting a reasonable fee for testing the accredited herds. But during the accreditation of many of the herds, new practitioners located in surrounding towns and started getting practice worked up by cutting prices—for instance, driving 60 miles to dehorn 17 head of cattle and charging $10.00 for the job. In territory where the local practitioner had been working with the federal and state men to get the farmers to sign up, these new men offered to test several herds, all told, around 60 head, for 25 cents a head and travel from 40 to 60 miles to do the job. If this kind of price cutting continues, what is the inducement for young men to take a course? A hod carrier and many other la-

borers have them stopped as far as getting money is concerned.

I don't believe it is to the interest of any state or federal men to run the profession down to a low basis of this kind. The approved and accredited men should get together and agree on a fair price to the stock owner and themselves. What are our associations for? I listened to good men lecture in Toronto for three years, and none of them advised us to get out in the world and commence to knife each other by underbidding on work.

I have made the following prices: 72-hour test, animals within two miles, up to 10 head, by the call, $5.00; from 10 to 25 head, $1.00 each; from 25 to 75 head, 75 cents each; from 75 head up, 50 cents per head. I have not charged mileage unless it was many miles away; then about the same as the federal man charges or is allowed for the use of his car, seven cents per mile. I should like to have the comments of other practitioners.

Geo. D. Wood, V. S.

Springfield, Vt.

METHODS OF SLAUGHTER

Throughout practically the whole of Holland, with the exception of Rotterdam, horses are slaughtered by the "humane killer," as are cattle. At Rotterdam, however, the pole-axe is used, but it is entrusted to two experienced and trustworthy men. It seems curious that the pole-axe should be used in Rotterdam, while the more certain and therefore more humane method has been in use for a considerable time in Amsterdam. One can only surmise that the use of the pole-axe is due to local prejudice, such as still prevails in this country.

In Belgium the horses are slaughtered by the "humane killer," the pole-axe or the hammer, and according to information received from time to time from the S. P. C. A. at Antwerp, the use of the "humane killer" has increased during recent years as it has in this country.

In France the "humane killer," the pole-axe and the hammer are used. As regards Paris, the trade in butchery horses is confined to a large public abattoir under the department of the Prefect of Police, and to it three veterinary surgeons are attached. The abattoir is devoted entirely to the slaughter of horses, between 70,000 and 80,000 being killed annually. So far as Belgium and Holland at any rate are concerned, the horses are blind-folded before being felled.

According to one objector to the export of horses to the Continent, in some slaughter houses in Belgium, the animals are killed with the knife as sheep and pigs are in Great Britain. Inquiries have been made from time to time with regard to the alleged killing by the knife, but it has been impossible to obtain any corroboration that this is done, and the allegation has always been denied.—R. G. Linton, M. R. C. V. S., British Veterinary Association Congress, Aberdeen, Sept. 10.

MOTORS AND HORSES

There are nearly as many automobiles in use in the United States today as there were horses at the time when automobiles were invented. That is one impressive fact in current statistics. There are now approximately 15,221,183 automobiles in use, and in 1900 there were approximately 13,538,000 horses on farms and probably 3,000,000 not on farms. Today there are 18,853,000 horses on farms and probably about 1,700,000 elsewhere. At this present increase of motors and decrease of horses, in a short time the former will outnumber the latter.

That does not mean, however, that we are likely to reach a horseless age as many have predicted. There has been a decline in the number of horses not on farms, from 3,183,000 in 1910 to only 1,706,000 in 1920, so our larger cities seem to be approximating a horseless state. But in the rural regions the decline in the number of horses is but little more marked than in some other domestic animals. Moreover, it is so subject to fluctuation that it will presently increase again. Between 1893 and 1900 it fell from 16,206,000 to 13,538,000, only to rise the next year to 16,744,000 and to 21,555,000 in 1918. Since the last named date there has been a decline.

The real explanation of the statistics seem to be that the people of this country are increasing enormously in numbers, and not merely changing their means of transportation.

Thirty years ago they had about 19,000,000 horses and no automobiles. Now we have more than 20,000,000 horses and more than 15,000,000 automobiles, a percentage of increase far greater than that of the population, which means more people are riding and that all people are riding more than they did a generation ago.

The World War proved that notwithstanding the aeroplane and high explosives, the horse is increasingly indispensable in all military operations.—Lieut. Col. Walter Fraser, V. C., Army Veterinary Bulletin.